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Introduction

Dear readers,

This is the first Issue of the new founded “Journal of Applied Research in the Digital Economy”. We congratulate to all participants, who actually enabled the publication of this first issue “chapeau”.

This issue shows fascinating topics. The first article is the first empirical study on XBRL IFRS filers, which are listed under the New York Stock Exchange. It provides valuable research findings and we hope the publication will have widespread diffusion within academia. A new measure of accounting reporting complexity (ARC) based on customized extensions XBRL elements in relation to the number of reporting tags (NRT) is proposed, expressed as the relative Extension Rate (ER) as a behavioral economics solution to improve markets. This article is based on the “transparency technology XBRL (eXtensible Business Reporting Language)” Sunstein (2013), which should make data more accessible as well as usable for private investors. Overall, the findings contribute to the emerging behavioral economics trend with a novel application in data science and accounting.

The second article attempts to give directions on the newest trend of Artificial Intelligence. Stateshuman and diplomats are invited to consider three major trends in the wake of the Artificial Intelligence (r)evolution: (1) Artificial Intelligence has gained citizenship as robots have become the first citizens in Saudi Arabia. With these ethical questions arise the question of a stratified citizenship. Robots and algorithms may only be citizens for their protection and upholding social norms towards human-like creatures but may not have full citizen privileges such as voting and holding a public office. (2) Big data revolutions coupled with computational power hold unprecedented opportunities for crowd understanding, trends prediction and civil control. Ethical boundaries may also include data breaches, privacy infringements and discrimination.

The third article covers the topic “Big Data”. Today enormous data storage capacities and computational power in the e-big data era have created unforeseen opportunities for big data hoarding corporations to reap hidden benefits from individual’s information sharing, which occurs bit by bit in small tranches over time. This paper presents underlying dignity and utility considerations when individual decision makers face the privacy versus information sharing predicament. Thereby the article unravels the legal foundations of dignity in privacy but also the behavioral economics of utility in communication and information sharing. From legal and governance perspectives, the outlined ideas may stimulate the e-privacy discourse in the age of digitalization but also serving the greater goals of democratisation of information and upheld humane dignity in the realm of e-ethics in the big data era.

Many greetings from the Editor-in-Chief

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Measuring Accounting Reporting Complexity with customized extensions XBRL – A Behavioral Economics approach

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ABSTRACT: We propose a new measure of accounting reporting complexity (ARC) based on customized extensions XBRL elements in relation to the number of reporting tags (NRT), expressed as the relative Extension Rate (ER) as a behavioral economics solution to improve markets. Behavioral insights have recently gained attention in different scientific and applied fields. Thereby behavioral economists set out to improve market conditions to aid practitioners and consumers make wiser and more informed decisions that have a positive impact over time. XBRL extensions reduce comparability of financial disclosures and complicate financial analysis and investor decision making. We find that ER is positively associated with market capitalization and profitability. ER is on average higher in industries perceived as complex. The preparation and disclosure of more accounting items deviating from the base taxonomy is more complex for consumers of financial and non-financial information. Increasing ER imply comparability among peers is less enabled. Comparing with standard used indicators of operating and linguistic complexity, the associations between ARC and these outcomes are more consistent, exhibit greater explanatory power, and have stronger economic significance. The ER resulting from IFRS-filers, i.e. companies which prepare their financial statements under International Financial Reporting Standard (IFRS) are on average significantly higher than US GAAP filers, i.e. companies which prepare their financial statements under United States General Accepted Accounting Principles (US GAAP). In addition, the authors identify the nature and reasoning of extensions by conducting semi-structured interviews. This article is based on the “transparency technology XBRL (eXtensible Business Reporting Language)” Sunstein (2013), which should make data more accessible as well as usable for private investors. Overall, the findings contribute to the emerging behavioral economics trend with a novel application in data science and accounting.
KEYWORDS: Accounting Reporting Complexity, Behavioral Economics, Customized Extensions Elements, financial reporting quality and inductive method, IFRS Taxonomy, Nudging, Relative Extension Rates, XBRL.

RESEARCH FINDINGS/ INSIGHTS: This behavioral economics study investigates the impact of the extension rate on the complexity of accounting. The study is based on empirical data, which has become recently available to a large extent as XBRL filings have become mandatory for cross-listed companies preparing their financial statements.

METHODLOGY: A mixed-method behavioral insights approach is followed, which includes an inductive quantitative method using publicly available XBRL interactive reports based on IFRS filers and a qualitative method, which is based on interviews resulting in expert judgements. To the knowledge of the authors, this is the first study taking into account companies applying the IFRS Taxonomy, as this became mandatory for NYSE (New York Stock Exchange) cross-listed companies to publish their annual reports in an interactive format using XBRL and the IFRS-taxonomy in 2018.

4. Introduction

Accounting complexity represents an important issue for academics as well as practitioners. Complexity has a long tradition to be discussed in behavioral economics – the interdisciplinary opening of neoclassical economics with an emphasis on addressing real-world relevant influences on decision making. An increase in complexity can have a negative impact and effect on the investor decision making as it influences the reporting quality. Assessing, mapping and analyzing accounting information is thereby deteriorated. Complexity is according to Iatridis (2011) regarded as directly related to the concept of accounting quality, as complexity increases when accounting quality decreases. While in the age of digitalization accounting also becomes digital, this paper will analyze accounting quality considering digital structured financial reporting. Ample evidence on the impact of complexity on decision making exists in behavioral economics (Bowles, 2004, Chapman & Elstein, 1995, Colinsky, 1996, Gentner, 2002, Giglio, Maggiori & Stroebel, 2014, Gintis, 2000, Green & Myerson, 2004, Kahneman, 2011, Puaschunder & Schwarz, 2012); but what the implications are for digital economies remains unclear.

Since the end of the 1970ies, Behavioral Economics revolutionized mainstream neoclassical economics and decision-making theory. Behavioral economists have recently started to nudge – and most recently wink – people into favorable decision outcomes, offering promising avenues to steer social responsibility in very many different domains, ranging from marketing, corporate governance to public affairs and most recently financial leadership. A
wide range of psychological, economic and sociological laboratory and field experiments proved human beings deviating from rational choices as standard neoclassical profit maximization axioms failed to explain how human actually behave. Human beings rather use heuristics in their day-to-day decision making. These mental short cuts enable to cope with a complex world yet also often leave individuals biased and falling astray to decision making failures. What followed was the powerful extension of these behavioral insights in the domains of public administration and public policy making. Behavioral economists proposed to nudge and wink citizens to make better choices for them and the community. Many different applications of rational coordination followed ranging from improved organ donations, health, wealth and time management, to name a few. Behavioral Finance is one of the most novel developments in Behavioral Economics. In all this literature missing is clear information how to lead efficiently given mental shortcuts and behavioral biases in a complex world. Yet to this day, behavioral economics has not entered the emerging digital interactive research stream.

In the context of digital interactive reporting, the most recent academic literature assumes high volume and more unique company specific accounting information as to support the increase in complexity (Hoitash and Hoitash, 2017). However, measuring accounting complexity continues to be difficult as measures with high explanation power are not widely available. As a consequence, a large body of academic research substitutes accounting complexity with aggregate, indirect, and less exact measures of operating complexity.

Fueled by the widespread diffusion of the internet, the age of digitalization emerged in the last twenty years. The emerging autonomy of digitalization holds unique potentials alongside unprecedented economic superiority, data storage and computational advantages. With regard to Financial Reporting, this trend has led to the development of the Extensible Business Reporting Language (XBRL), which – according to the academic literature – is expected to revolutionize financial reporting (Matherne and Coffin, 2001). Financial reporting information can be automatically transferred to machines without the necessity to map, as financial reporting information is structured (Bovee et al., 2003). XBRL is without cost available and has developed as the de-facto global language for exchanging business information electronically. XBRL taxonomy fixed by the regulator (e.g. Securities and Exchange Commission) provides an identifying tag for each individual item of data, whether numeric or textual. This tag is computer readable and allows the information to be used interactively and more accurately as when provided in an unstructured format e.g. PDF format.
A main feature of XBRL is the optionality for the filers to create new tags (and a new custom taxonomy at the same time). This reflect the “X” which implies extensibility. These new tags are called customized extensions. Filers can create as many extensions as they want as long as local regulation allows. The background is that those customized extensions reflect voluntary new tags and are regarded as relevant to describe their specific situation. The aim of this paper is to investigate the determinants and value relevance of these extensions for market participants considering the new availability of interactive data from IFRS-filers. IFRS is a principles-based accounting regime and extensions rate are expected to be higher and more relevant based on early findings (Beerbaum, 2014). Those early findings – considering the new extended scope of empirical data – can be more substantiated, generalised and validated. Further analytical elaboration is now possible for the first time, given the larger data sets available and the novel computational power.

Studies on the advantages of XBRL for market participants are numerous but little is known about the mechanisms underlying the impact of taxonomy extensions and the practical nature of such extensions in the context of IFRS interactive filings. Similarly, our study is the first to focus on IFRS filers applying the IFRS Taxonomy, provide interactive filing and the first which is based on a large database of IFRS filers, as previous studies focused on US Taxonomy elements for each disclosure concept are not available, and thus the filer creates an extension element. Considering the US GAAP based literature GAAP (Debreceny et al., 2011a, Li and Nwaeze, 2015, Chou and Chang, 2008, Hoitash and Hoitash, 2017), it is concluded that extensions without incorporating technical errors provide decision-useful information. However, if extensions are not correctly set-up – particularly when a semantically equivalent element already exists in the base taxonomy – extensions add no information content. Due to identified errors in interactive filings, critics express concerns that the reporting extensibility allowed under XBRL open taxonomy will reduce the possibility to compare companies to each other and financial disclosures increase their complexity and therefore complicates financial analysis. Proponents conclude that XBRL extensions will provide users with new and relevant information. Companies want to tell their specific story and reflect their competitive advantage and uniqueness. The results for later periods of XBRL adoption provide support for the SEC’s policy that allows registrants to use XBRL extensions to increase users’ understanding of the information in financial statements.
The focus of this study is on extensions and the analysis of correlations to other metrics. Prior research shows that the impact of XBRL adoption for market participants is important but the great majority of them considers XBRL implementation as a uniform process (i.e. adoption or not). However, this approach does not allow assessing how investors perceive information published by filers using XBRL’s extensions. The results for later periods of XBRL adoption provide support for the SEC’s policy that allows registrants to use XBRL extensions to increase users’ understanding of the information in financial statements.

Since January 2009, when the Securities and Exchange Commission (SEC) issued rules on the submission of interactive filings applying the XBRL standard, a lot of articles have been prepared which describe the benefits of XBRL (Roohani et al., 2010). Those articles could only be based on interactive filings preparing financial statements under US GAAP. Since last year for the first time a larger number of companies’ interactive filings became available, which also prepare their financial statement under International Financial Reporting Standards (IFRS).

5. Background of Accounting Quality and Accounting Complexity

Complexity is embedded into the concept of accounting quality (Iatridis, 2011). The term “accounting quality” needs, however, to be used carefully as it has different connotations and implications. The concept of accounting quality remains fuzzy. To this day it is unclear how an optimal output can be defined and what this optimal level for most of the accounting quality proxies is. Hence, it also remains unclear whether an increase (decrease) in the level of the accounting quality metric will necessarily lead to an increase (decrease) in what is supposed to be the (in fact unobservable) quality of accounting. To the knowledge of the authors, no theory clearly links the commonly used metrics to “true” accounting quality. A further problem is that several proxies for accounting quality exist and that it is yet not fully clear, which one is the most suitable. Further unclear questions are:

(a) what is the connection or correlation between the different proxies,
(b) whether and what kind of trade-offs between different proxies exist and
(c) what conclusions about user’s preferences can be drawn from earnings quality studies.

So far, there is almost no theoretical or model-based literature that would perform an assessment of earnings qualities with more granularity and of high practical relevance.
Behavioral economics has offered ample evidence on the impact and relevance of complexity on the decision making quality (e.g., Ariely & Wertenbroch, 2002, Arrow, 1978, Ashraf, Karlan & Yin, 2006, Beshears, Choi, Laibson, Madrian & Sakong, 2011, Gaertner, 2009, Kaur, Kremer & Mullainathan, 2010, Ostrom, 1990, Sen, 1995, 1998, Thaler & Sunstein, 2008, Trope & Fishbach, 2000, 2004, Tversky & Shafir, 1992); but to this day no information is given for concrete implications of complexity in the digital accounting domain. The relationship between the different earnings quality measures is still rather unclear, implying that reliable estimates considering accounting quality might require controlling for other accounting qualities from an empirical point of view. This does, however, not imply accounting quality research, which would not have any impact on practice advice. A recent implementation is the SEC’s attempt to automatically screen filings of all issuers and to calculate a risk score for potential fraudulent behavior based on accounting quality metrics. The Accounting Quality Model (AQM) – or “Robocop”, as the financial press tends to call it – automatically creates a risk score for all registrants within 24 hours after their electronic filings. A higher risk score makes the enforcement staff aware of the fact that a filer might be worth looking at in closer detail. Thereby, the system makes the SEC’s inspections more efficient and effective.

Accounting quality can be addressed from an input and output perspective. Inputs relate to the quality of accounting standards and the quality of the reporting process. Outputs look at how useful the published reports are for economic decision making. According to IAS 1.9, the objective of financial statements is to provide information about the financial position, financial performance and cash flows of an entity that is useful to a wide range of users in making economic decisions. Financial statements shall present fairly the financial position, financial performance and cash flows of an entity. Fair presentation requires the faithful representation of the effects of transactions, other events and conditions in accordance with the definitions and recognition criteria for assets, liabilities, income and expenses set out in the Framework. IASB assumes that rigorous application of IFRS implies useful financial statements. IAS 1.17 consistently clarifies that in virtually all circumstances, an entity achieves a fair presentation by compliance with applicable IFRS (Zimmermann and Werner, 2006).

IAS 8 sets out a hierarchy of authoritative guidance that management considers in the absence of an IFRS that specifically applies to an item. In extremely rare circumstances it might happen that a firm concludes the application of IFRS would not result in a fair presentation. In such cases the entity shall depart from requirements that would violate a fair presentation if the
relevant regulatory framework requires, or otherwise does not prohibit, such a departure. This overriding principle is set out in IAS 1.19, but is rarely used in practice.

There are two fundamental principles under which IFRS financial statements are prepared and both are relevant to accounting quality. Except cash flow statements, IFRS financial statements are prepared under accrual accounting (IAS 1.27).

Accrual accounting incorporates the effects of transactions and other events and circumstances on a reporting entity’s economic resources and claims in the periods in which those effects occur, even if the resulting cash receipts and payments occur in a different period.

Going concern: Under this accounting concept the entity will continue to operate in the foreseeable future (i.e., at least within the next twelve months) and that there is no need to liquidate or curtail materially the scale of its operations (F.4.1).

The IASB Framework also sets out some qualitative characteristics of useful financial information. The two fundamental qualitative characteristics inherent to IFRS are “relevance” and “faithful representation” since the IASB assumes that useful information must be both relevant and faithfully represented (F.QC17).

- **Relevance**: Relevant financial information enables of making a difference in the decisions made by investors (F.QC6).

- **Faithfulness**: To be a perfectly faithful representation, a depiction would have three characteristics. It would be complete, neutral and not constitute any material errors (F.QC12).

Obviously, this constitutes a conflict considering relevance and faithful representation. However, it is the preparer’s task to balance and find an optimal trade-off for this conflict with the aim to maximize decision usefulness. Besides objectives, with conflicting directions, there are also specific qualitative characteristics which restrict decision usefulness (F.QC19-34). These include:
• **Comparability:** Information is more useful if it can be compared with similar information about other entities and with similar information about the same entity for another period or another date.

• **Verifiability:** Different knowledgeable and independent observers could reach consensus, although not necessarily complete agreement, that a particular depiction is a faithful representation.

• **Timeliness:** Newer information might be more useful and should, thus, be reported in a timely fashion even when later disclosure could increase reliability.

• **Understandability:** Information shall be presented in a way that users can access their content. The principle does, however, not suggest that complex information is allowed to remain unreported or would have to be reported in a way that users would not have to seek for advice if not competent to understand.

IAS 1 additionally contains a number of accounting principles which assure accounting quality from an input perspective is executed:

• **No offsetting allowed:** An entity shall not offset assets and liabilities or income and expenses, unless required or permitted by a standard issued by the IASB. Prohibiting offsetting assures better financial information because users can observe more than the net effect of certain transactions (IAS 1.32).

• **Focus on material aspects:** An entity shall present separately items of a dissimilar nature or function unless they are immaterial (IAS 1.29). Information is material if omitting it or misstating it could influence decisions that users make on the basis of financial information about a specific reporting entity (F.QC11). Materiality is an ambivalent concept. On the one hand, it allows disregarding irrelevant information. On the other hand, it imposes the risk that information remains undisclosed due to the preparer’s assumption of the information not being material.

• **Consistency across time:** An entity shall retain and continue the presentation and classification of items in the financial statements regardless of any periods.

The three most frequently cited categories of complexity applied in accounting research are operating, linguistic, and accounting-based complexity (Hoitash and Hoitash, 2017). Complex
operations also lead to an increase in the severity to translate economic activities into accounting disclosures. Due to the often non-existence of granular reporting disclosures, researchers often identify observable key performance indicators of operating complexity. Frequently applied are the size of the business and geographic segments and the existence of foreign operations. A higher number of business segments often suggests the presence of more complicated economic operations because segments usually entail different products, services, processes, and/or customers and each segment often earns revenues and incurs expenses. In addition, because segments often transcend industries, knowledge of accounting standards across industries is needed to disclose segment information.

ARC subsumes a portion of complexity that is captured by common operating complexity measures. Reportable segments data are captured by XBRL tags. Unlike a measure of the number of reported segments, ARC experiences greater variation as it fluctuates with the amount of disclosed segment information and not only with the number of segments disclosed. Similarly, accounting information that pertains to foreign operations is captured in greater detail by ARC. In addition, ARC also captures the disclosure of other accounting information (e.g., lease, derivative, inventory, and tax accounting) that is not captured by operating complexity measures.

The second category, linguistic complexity gets more applied in accounting research. The most commonly used measure of linguistic complexity is the (Gunning, 1952) Fog Index, followed by the length of 10-K filings (Loughran and McDonald, 2014). These measures capture the readability of the financial reports. Accordingly, studies using these measures have predominantly focused on financial statement users. Miller (2010) Damianou and Lawrence (2013) and Biddle, Hilary, and Verdi (2009) –all focus on shareholder investment decisions, showing lower trading volume and lower investment efficiency when the Fog Index is higher and the financial reports are longer. Lehavy et al. (2011) and (Bozanic and Thevenot, 2015)– focus on analysts and find that less readable reports are associated with poor analyst performance. Taken together, these studies suggest that less readable reports are more difficult to consume.

The third category considers application of accounting information to measure complexity. (Plumlee, 2003) uses changes imposed by the Tax Reform Act of 1986 and finds that analysts’ forecast errors increase with more complex tax law changes. Peterson (2012) uses the number of words and recognition methods in revenue-recognition disclosures and finds that revenue-
recognition complexity increases the likelihood of revenue-related restatements. Fang et al. (2016) find less accurate and more dispersed earnings forecasts among firms that begin using derivatives. Each of these studies concentrates on a specific account and employs a distinct approach for measuring complexity in that account. Together, these studies demonstrate the importance of accounting complexity. While ARC belongs to this complexity category, it is unique in that it relies on all monetary accounting disclosures that appear in Item 8 of the 10-K filings and can serve as a broad firm-level measure of accounting complexity. Our following study is the first introduction of behavioral insights research into the ARC complexity category.

6. Design of the Research Methodology

Methodology encompasses analysing the methods implemented for a field of study from a theoretical and systematic point of view (Franklin, 2012). Research represents the search for knowledge (Kothari, 2004). Assessment of the methods employed is essential in management research. This is due to the fact that the acceptance of research is also influenced by the use of methods which were proved to be robust and rigorous (Scandura and Williams, 2000). Surveying the literature reviews, there is currently little substantial understanding of the nature of customized extensions considering companies preparing financial statements under IFRS for the purpose of digital structured reporting. But it can be claimed that digital structured reporting has become of broad interest in the academic and business literature in the last couple of years, as the number of digital structured reporting filings are increasing, regulators increasingly require and market consumers demand structured data for more efficient computer-supported analyses. Scientific research is lacking on customized extension and on the relation of customized extensions to accounting complexity.

Neither action research nor a collaboration between management researchers and practitioners can be successful in achieving research which is rigorous as well as relevant at the same time according to Kieser et al. (2015). This perceived lack of practical relevance of management research was also one main trigger for this project and represented a strong motivation for the execution of our paper.

The methodology of this research is based on the understanding of economics as an “application-oriented social economy” (Ulrich, 1984). According to this interpretation, practical action in enterprises is the knowledge perspective for business economics. Thus, the
aim is to develop useable knowledge for leadership and management that offers the best possible contribution to solving real business problems (Kagelmann, 2013). Economic research as an interdisciplinary branch of science consistently reviews methods, concepts and rules critically and modifies them to some extent. This can only be done in connection with theory-based statements and practical knowledge (Ulrich, 1984). While fundamental research is concerned with theory-related questions, research problems in applied sciences arise from the practical context. Therefore, theory and practice are closely linked (Ulrich, 1984). This applies particularly to the problem of customized extensions, as the literature review will demonstrate.

This following research design will apply behavioral economics detected human decision making insights but also nudge and wink theory in order to propose how to use mental heuristics, biases and nudges in the finance domain to profit from economic markets providing clear communication and accounting strategies. A behavioral economics extension of behavioral insights has most recently entered financial market research to explain the impact of heuristics, biases and nudges on financial choices. The application of behavioral economics to accounting theory in the digital age accounts for the most cutting-edge approach to capture the power of real-world relevant economics in the digital age. Drawing from a line of research on bounded rationality, this following paper will enable readers to find how economics can better the digital economy and allow policy makers to derive inference how nudges and winks can help make wiser decisions in a digitalized economy and society. The article thereby serves to delineate the potential of behavioral economics to implement digital economics alongside of providing an overview of behavioral sciences with an application in the new finance economy. In all, the paper serves to outline the necessary financial and digital skills to guide on practical advice for policy makers and financial experts alike following the great goal to provide real-world relevant means to minimize societal downfalls and imbue trust in the digitalized world economy.

In order to achieve the research objectives, it is therefore necessary to apply quantitative and qualitative methods. While the quantitative part of this research is the guiding data-collection instrument, the qualitative part of the research is addressing limitations, which are not fully explainable through the statistical outcome or do not comply with the underlying theory or research model. The insights from the expert interviews support advanced understanding of the nature of extensions and the connection to accounting complexity.

There is a high number of research in the so-called programmic literature according to Kieser et al. (2015) that shares the concern that the output of the scientific results of
management studies has only a low impact on the real management practice. According to Kiesel et al. (2015) the relevance gap between management research and practitioners cannot be overcome due to the different social systems considering system theory Kieser and Leiner (2009). A sequential explanatory mixed model, with a quantitative and then a qualitative approach, will therefore be applied.

7. Accounting literature on earnings management

How does the system function? The interesting fact from an academic perspective is that it strongly relies on models which have originally been proposed in the accounting literature on earnings management. For instance, the model estimates the magnitude of “discretionary accruals”. Accruals in general are neither good nor bad. They emerge because accounting rules generate a time series of net income figure, which is, by construction, smoother than the underlying stream of cash flows. A simple example for this property to emerge is an investment of 1,000,000 in year 1. This investment negatively affects cash flow in year 1, but accountants will disregard this effect by recognizing the investment as a balance sheet item, depreciated, say, straight-line over 10 years, leading to smoothly expensing 100,000 per year.

The idea behind measuring “discretionary” accruals is the following: Accruals emerge in the normal course of business. This particularly holds for working capital accruals, which include positions such as inventories, accounts receivable or accounts payable. If sales increase, we would naturally expect that this will have an impact on working capital accruals: The credit sale part will increase receivables, but there is also (more) inventory leaving stock. Identifying factors which explain these “normal” changes in accruals also allow us thinking about identifying a part of changes in accruals that is unexpected and thus likely to be explained by earnings management activities. Essentially, this is what Robocop does: It uses a sophisticated and calibrated earnings management model to identify firms with more aggressive accrual accounting.

Since compliance with IFRS is an essential ingredient to accounting quality, an entity whose financial statements comply with IFRSs shall make an explicit and unreserved statement of such compliance in the notes. An entity shall not describe financial statements as complying with IFRSs unless they comply with all the requirements of IFRSs. (IAS 1.16). Compliance with IFRS also requires delivery of a complete set of financial statements regarding elements
such as the balance sheet, the income statement etc. (IAS 1.10). But it also entails that neither business transactions that should be reflected in the financial statements remain unreported nor business transactions that should not be reflected are recognized. This leads to some basic recognition principles.

The use of XBRL for financial reporting should provide benefits to parties interested in financial information such as investors, financial analysts, and regulators as it enhances information exchange, lowers accessing costs and times, reduces errors, and improves information analyses (Briciu et al., 2010) and Roohani et al., 2010). There are several studies, which have tried to give proof for the benefits based on empirical numbers by comparing the filings before and after the adoption of XBRL (Chou & Chang, 2008). The first SEC-related filings from IFRS fliers are out on the market and they provide evidence for our hypothesis that ESDs are more relevant for IFRS than for US GAAP filers. Our assumption is that this is due to principles-based taxonomy and the accounting regime with no industry specific reporting elements, which are not compensated by common practice elements. Moreover, as a University we focus more on the academic point of view, which mainly included the analysis and consideration of the academic studies on the topic and our main objective is to further connect such an initiative with academia.

Overall for academics, the paper plays an important role in the evaluation of nudging and its influence on the stability of economic markets and societal systems. Depicting nudging during this unprecedented time of economic change and regulatory reform holds invaluable historic opportunities for financial leaders on how to strengthen markets by nudges but also overcome unknown emergent risks within digitalized economies. In its entirety, the paper is also targeted at bestowing market actors with key qualifications to lead and to follow strategically in a complex and digitalizing world.
8. Literature Review and Hypothesis development

In the following section, the most cited literature on XBRL extensions is summarized, from which hypotheses are derived.

*L1: Impact of Extensions in XBRL Disclosure on Analysts' Forecast Behavior (Li and Nwaeze, 2018)*. According to Li and Nwaeze, abnormal extensions reflect XBRL extensions that exceed the expected level for industry peers. Those abnormal extensions are assessed from different perspectives, which are summarized as follows:

- **Positive impact**: Registrants use the extensions to provide greater details about transactions and events unique to their reporting circumstances.
- **Non-positive impact**: that the reporting discretion permitted under the mandate will complicate and impede financial analysis.

The SEC and proponents contend that the extensions *improve* registrants' financial information environment and *facilitate* financial analysis. The authors findings (Li and Nwaeze, 2018) are that abnormal extensions are positively associated with the number of analysts who follow the firm and forecast accuracy, but negatively associated with forecast dispersion. Dispersion impact is greater for filers with many business segments and harder to read financial statements. Concluding from that, the authors belong to the group of authors who support the allowance of extensions as a means of enhancing quality and interpretation of financial disclosures.

*L2: Association between Extensions in XBRL Disclosures and Financial Information Environment (Li and Nwaeze, 2015)*

This study examines the association between XBRL extensions and financial information environments of firms, where “financial information environment” refers to the degree to which a firm's financial information is reflected in the information held/used by investors.

An XBRL extension is a customized definition of a financial concept or reporting situation that is not available in the Taxonomy. In 2009, the U.S. Securities and Exchange Commission (SEC) allowed firms to begin to use extensions to add new concepts in their financial disclosures. Critics express concerns that the reporting discretion permitted under the
XBRL mandate will reduce comparability of financial disclosures and complicate financial analysis. Proponents contend that XBRL extensions will provide users with new and relevant information. To evaluate the competing views, we employ several proxies for financial information environment and perform analyses for early and later phases of XBRL adoption. We find that XBRL extensions are negatively (positively) associated with financial information environments of firms at the early (later) phases of XBRL adoption. The results for later periods of XBRL adoption provide support for the SEC's policy that allows registrants to use XBRL extensions to increase users' understanding of the information in financial statements. According to the authors, the higher the degree to which firm financial information is reflected in the information held/used by investors, the lower the extension rate will be.

**L3: Do Managers Use Extension Elements Strategically in the SEC's Tagged Data for Financial Statements?** (Huang et al., 2018)

This study examines whether firm use of XBRL extension elements increases the complexity of mandatory SEC filings. Using the ratio of extension elements to total elements in XBRL 10-K filings as the measure of XBRL complexity, we find that firms' XBRL filings are more complex when the firms are performing poorly, an effect that is more pronounced when firms are more complex. Furthermore, complex XBRL filings are associated with less (more) persistent positive (negative) earnings. Collectively, our results are consistent with managers using extension elements strategically to increase XBRL complexity, obfuscating XBRL-tagged financial information.

**L4: Measuring Accounting Reporting Complexity with XBRL** (Hoitash and Hoitash, 2017)

Complexity is proposed as a new measure of accounting reporting complexity (ARC) based on the count of accounting items (XBRL tags) disclosed in 10-K filings. The preparation and disclosure of more accounting items is complicated because it requires greater knowledge of authoritative accounting standards. This aspect of complexity can increase the likelihood of mistakes, incorrect application of GAAP and can ultimately lead to less credible financial reports.

Consistently, we find that ARC is associated with a greater likelihood of misstatements and material weakness disclosures, longer audit delay, and higher audit fees. In comparison to commonly used measures of operating and linguistic complexity, the associations between ARC and these outcomes are more consistent, exhibit greater explanatory power, and have stronger economic significance. These and additional validation and robustness tests suggest
that ARC more completely reflects accounting complexity. In addition, XBRL extensions increase complexity and those XBRL filings are more complex, if firms are performing poorly. Complex filings are associated with less persistent positive earnings. ARC exhibits several advantageous properties, including across- and within-firm variation, availability for the universe of SEC filers, and a direct connection to accounting, inherent in its derivation from detailed accounting disclosures. Finally, because it relies on a comprehensive set of detailed accounting data, ARC broadly captures accounting complexity, while, at the same time, it can be disaggregated into account-specific measures of complexity and more transparency, quantitative and qualitative disclosures.


The authors examine factors related to the cross-sectional variation in nonstandard reporting for a sample of XBRL 10-K filings submitted to the SEC from 2009 to 2013. We find that the extent to which the reporting behavior deviates from common reporting, as well as the (voluntary) disclosure level, influences the extent of taxonomy extensions. Another finding of this research is that firms that are less involved and have less experience in the XBRL filing process tend to exhibit higher levels of customization. However, the authors cannot confirm that, on average, firms with lower accounting quality exhibit a higher deviation from the pre-defined standard.

L6: Flex or Break? Extensions in XBRL Disclosures to the SEC (Debreceny et al., 2011a)

The Securities and Exchange Commission (SEC) has adopted the eXtensible Business Reporting Language (XBRL) in a multi-year program to enhance the functionality of the Commission’s EDGAR database. Filers tag their financial statements with elements from a taxonomy that defines the reporting concepts so that the XBRL files can be understood by information consumers. The U.S. GAAP taxonomy was designed to represent common reporting practices and support the disclosure requirements of U.S. GAAP. If taxonomy elements for each disclosure concept are not present, the filer creates an extension element. Extensions, when used appropriately, provide decision-relevant information. When used inappropriately, particularly when a semantically equivalent element already exists in the foundation taxonomy, extensions add no information content. The research analysis of the authors relates to extensions made in a subset of the SEC XBRL filings between April 2009 and June 2010. According to the authors’ conclusions forty percent of the identified extensions
were unnecessary, as in fact semantically equivalent elements were already existing in the U.S. GAAP taxonomy. Extensions that aggregated or disaggregated existing elements comprised 21 percent of the extensions.

**L7: Irregularities in Accounting Numbers and Earnings Management—A Novel Approach Based on SEC XBRL Filings** (Henselmann et al., 2015).

This study proposes a simple analytical prescreening measure that uses abnormal digit distributions at the firm-year level to identify firms suspected of having managed earnings. On average, the authors find that the constructed measure indicates a greater amount of irregularities in the reported accounting numbers of firms with higher incentives to engage in earnings management.

**L8: The Association between XBRL Adoption and Market Reactions to Earnings Surprises** (Yen and Wang, 2015).

This paper investigates whether the adoption of XBRL is associated with market reactions to earnings surprises around 10-Q and 10-K filing dates based on a sample of XBRL filers. Main findings of the authors demonstrate that the adoption of XBRL is positively associated with market reactions to earnings surprises around 10-Q and 10-K filing dates only for Phase II, not for Phase I, filers except when a Phase I filer is followed by fewer analysts. The full-sample test shows that the hypothesized effect also exists for Phase III filers, and we observe an increase in market reaction for Phase II filers after their second year of adoption. We believe this study has policy implications and may alleviate firms' concerns regarding the benefits of adopting XBRL.

**A9: The relevance of extensions for stock markets and Corporate Governance** (Cormier et al., 2018). Based on the findings of the authors, good corporate governance is positively associated with voluntary XBRL extensions. It is observed by the authors that XBRL extensions enhance the positive relationship between GAAP earnings and stock price. However, this positive association is reduced for firms with a good governance, suggesting a substitution effect between XBRL extensions and corporate governance. Finally, it also appears that XBRL extensions would strategically be related to earnings quality.

**A10: Can XBRL detailed tagging of footnotes improve financial analysts' information environment** (Felo et al., 2018)? Based on this study if companies follow customized (as
opposed to standardized) footnote tags, forecast error and dispersion are less likely to decrease. This suggests that regulators may need to limit firms' ability to use customized tags.

**A11: XBRL Adoption and Expected Crash Risk** (*Yuyan Guan, 2018*). Based on the authors, firms use less standardized elements in financial statement for tag usage, the impact of XBRL mandate on investors’ perception of future crash risk will be weakened. XBRL-adopting firms may have incentive to disclose more information about firm performance.

9. Customised Extensions and Entity Specific Disclosures (ESD)

Extensions are regarded within this study as interchangeable with entity specific disclosures and point to the general implications and mechanics (Debreceny et al., 2011). In the case of that a taxonomy element does not correspond to the disclosure concept, the filer creates an extension element. Extensions, if used in an appropriate way, provide decision useful information. However, if not used in an appropriate way, e.g. when a semantically equivalent element is represented in the foundation or base taxonomy, extensions lead to negative signaling for the investor.

In general, two streams within the academic literature (Li and Nwaeze, 2018) exist. One stream concludes that ESDs provide benefits to the consumer of XBRL files, as comparability is improved, more detailed information is given and information asymmetries between insiders and investing public are lowered (Li and Nwaeze, 2015, Debreceny et al., 2011, Beerbaum, 2014). To this stream belong the concept that ESDs represent voluntary disclosures, which are pursued by companies to improve information supply to their investors and also reflect good corporate governance (Cormier, 2016, Roohani et al., 2010, Piechocki et al., 2009). The second stream of research focus on the associated concerns with the usage of ESDs: less comparability of financial and non-financial information, more inconsistencies, reflect conceptual errors in mapping the taxonomy to the reporting element (Debreceny et al., 2011).

XBRL research has so far very much focused on ESDs for US GAAP filers. Given the fact that the SEC approved the IFRS taxonomy in 2017 and the first NYSE listed Foreign Private Issuers (FPI) had to provide XBRL compliant files just recently empirical research became available and the following study provides first insights on that. There are not yet many empirical studies out for IFRS-filers applying XBRL.
The fact that by 2020 all European listed companies have to provide interactive filings with XBRL using the ESEF taxonomy, which is mainly based on the IFRS taxonomy caused the development that ESDs have become more in the focus of the academic research. For IFRS filers principles-based taxonomy, however, have different implications with ESDs. The reason also for this is that there is a conflict between a principles-based accounting regime and template-based taxonomy (Beerbaum et al., 2017).

ESD is defined as “sufficiently unique as to be considered specific to the reporting entity”. We assume that the definition might need to be reformulated given the fact that “sufficiently “is not accurate and difficult to measure. Could the term not be better defined in detail? We make reference to the definition, which we used, which focus more on the implication and mechanics of ESDs.

Additionally, the preparers of the guide should also look into the theory of why companies disclose and communicate and not only how. Based on Principal-Agent theory (Jensen, 1976), one main reason for companies’ disclosures is to overcome information asymmetries between the owner of the company and the managers. According to the accounting literature, this is also described as voluntary disclosures, which are contrary to mandatory disclosures not legally enforced. Mandatory disclosures are driven by legally binding requirements, which have to be implemented by all companies. The common practice approach intends to reflect those voluntary industry practices, however, due to the relevance of the concept the implication might be more substantial than expressed by the paper on ESD.

The authors of the paper might consider academic theory of disclosures or make reference to other overarching frameworks or epistemological underpinnings. While the task force primary focus is the regulator, we assume that for an open taxonomy, the preparer and the investor should be the primary focus point. Regulatory bodies rely mainly on closed taxonomies, in which ESDs are irrelevant. Adding to that, the nature and root cause for ESDs is complex and differs from industry to industry. In a principles-based regime – such as IFRS – interpretation of IFRS develop over time. The level and complexity of voluntary disclosures vary also very much. The level of voluntary disclosures in XBRL files affect the value relevance of GAAP earnings considering the quality of corporate governance. Based on studies from Cormier (2016) and Rao et al. (2013), good corporate governance is positively associated with
voluntary XBRL extensions. According to Rao et al. (2013) the extent of XBRL extension is associated with the percentage of independent directors, combined CEO chair of the board position, and firm size. Considering Cormier’s study XBRL extensions improve the positive relationship between earnings and stock price. However, according to this study, positive association is reduced for firms with a good governance, suggesting a substitution effect between XBRL extensions and corporate governance. This research concludes that XBRL extensions would strategically be related to earnings quality. Finally, the study shows that XBRL extensions attract financial analysts.

10. IFRS-Taxonomy: Principles-versus rule-based Taxonomy

The principles-based vs. rule-based debate in the U.S. was discussed after the Enron and WorldCom accounting scandal 2002 (Nobes, 2005). An intense discussion whether US GAAP should become more principles-based, as rules-based standards might give rise to “cookbook accounting”, without considering a substance-over-form approach (Parfet, 2000). So, if there is no discretion to the chef, the taste will always be the same. US GAAP tends to be mechanical and inflexible. Clear-cut rules have some advantages, but the risk is that this approach motivates financial engineering designed specifically to circumvent these knife-edge rules, as is very often given proof in the tax literature (Healy and Palepu, 2003). According to Nelson (2003) a standard should not be seen as only principles or rule-based but should rather be regarded as more or less rule-based. According to a behavioral analysis, Nelson (2003) concludes that rules can improve the accuracy of the communication of the standard setter and reduce imprecision associated with aggressive reporting due to unawareness of existing rules. Nelson (2003) does not consider that rules increase imprecision but also enable companies to structure transactions to meet the accounting rule without following the true economic substance of the transaction. This is one of the main arguments by supporter of principles or concepts-based accounting (Maines et al., 2003). They point to the challenge when moving from a rule-based to a concepts-based standard setting, as informed professional judgement and expertise for the implementation is increasingly required.

However, based on recent literature, a representation and structural conflict (Beerbaum, Piechocki and Weber, 2017) – particularly for principles-based taxonomies – exists. Behavioral economics approaches are used to predict equilibrium (Zhang et al., 2018). Such issues in accounting cannot be solved with standard-conventional techniques. From a normative
perspective, the main objective of IFRS are the decision usefulness for investors, as managers should disclose financial statements applying a true and fair view (Scott and O'Brien, 2003).

However, the recent conceptual conflict debate between IFRS principles-based and a prescriptive rule-based taxonomy does not follow those three groups, but the taxonomy limits the degrees of freedom and how regulations are implemented by IT and technology. Under an incremental approach, the IFRS taxonomy, as per substance prescriptive rule applied to IFRS, becomes gradually more rule-based.

Fig 1: Rule-based versus Principal-based Taxonomy
Although there is a conceptual conflict between a principles-based accounting standard and the development of a taxonomy compared to a template-based rule-based accounting framework, this appears in the case of the IFRS taxonomy as only a minor one. IFRS Taxonomy development faced this conflict for many years and is well aware of that. There is a deficiency in common practice elements, as they provide only partly detailed report elements, since they are only included in the IFRS taxonomy when they are reported by the majority of firms. On the other hand, this means that a minority of the common reporting elements are not considered in the IFRS taxonomy.

There are also voices in the academic literature, which based on empirical evidence conclude that IFRS does not only follow a principles-based approach (Nobes, 2005). An argument is often cited that IFRS only appears more principles-oriented, as the IFRS are less matured than e.g. US GAAP (Parfet, 2000). With increasing duration of application of standards, the demand for guidelines and clear and complete rules might increase.

Supporters of rule-based accounting argue that principles-based accounting requires a deep knowledge and expertise about the domain, and contrary to that compliance is easier since the requirements are prescriptive and leave little room for misunderstanding. Furthermore, rules-based approaches are easier to enforce. The key issue is striking an appropriate balance which encourages the spirit of the guidance to be complied with and does not undermine the exercise of judgement and the role of the profession.

Considering the literature review, most of the authors focus on the process of the development of the taxonomy and intend to extend the number of tags. On the one hand, there are only limited examples, in which a conflict is expressed. On the other hand, there is indeed a conflict between principles-based accounting and the taxonomy, as IFRS does not contain many specific disclosure requirements and therefore a high level of degrees of freedom exist, which becomes restricted by the taxonomy.

However, the advantages of a standardized unified taxonomy are obvious: improvement of comparability, reduced transaction costs for analysts when financial reporting information are analytically processed. As a consequence, more precise analyst forecast and reduced information asymmetries, for which the referenced studies provide an indication of confirmation.
An important question to answer will be how a provided taxonomy will have to be applied mandatorily and which degrees of freedom or options finally remain. This is particularly relevant for the application of a materiality concept and in this context the question if information can be omitted or aggregated. A mandatorily application would be against the principles-based accounting standard. Applying company specific elements or individual extensions would not violate against principles-based accounting, whereas the comparability would be limited.

A rule-based taxonomy is inductively as well as deductively developed by deducting the IFRS taxonomy since 2012. Deductively, the standard paragraphs and the examples for disclosures are derived de-jure from the bound volume. Inductively, de-facto external reporting disclosures of companies are analyzed for common practice elements. This is a mechanism which is not required in a rule-based accounting framework just as US-GAAP, as industry specific requirements are explicitly mentioned in the accounting requirements. A similar approach concerns German Gaap Accounting, which is code-based and defines – for instance for financial institutions – specific template-based disclosures based on the German Bank Accounting (RechKredV).

11. Assessment of XBRL

XBRL provides the following advantages:

- Allows participants in the financial supply chain to improve the foundation, exchange and comparison of business reporting information (Piechocki et al., 2009).
- Provides users with a standardized format, enabling software applications to exchange information more easily (Alles and Debreceny, 2012).
- Enables the automatic processing of information with the help of software applications (Matherne and Coffin, 2001).
- Automated comparison of financial and non-financial information involves less cost, as comparison between companies, which is currently performed on a manual basis, can be processed automatically (Jones and Willis, 2003).
- Facilitates the access to more granular data, including the source for the concept, e.g. the accounting standard (Müller-Wickop et al., 2013).
• Consists of meta data including specifications about the reporting entity, which is required for the monthly management report and the interpretation of the information (Zabihollah et al., 2001).

• Multi-language support as well as all existing recognized international taxonomies (Kurt and David, 2003).

• User has the possibility to extend reporting elements for company-specific reasons, which are called extensions (Debreceny et al., 2011b).

• Implements the core information needs of the user. XBRL does not require specification of text formatting, as the instance file is coded and not human readable (Branson, 2002). There exist viewers, such as the SEC XBRL viewer, which enable conversion of the instance file and allow the report to be displayed in a standardized format.

Taxonomies, dictionaries and thesauruses share the same characteristics that they enable the classification and organization of information within knowledge management systems, which will be further explained as follows.

These main advantages are summarized and transmitted into main user advantages, which are also based on a detailed literature study about XBRL.
Table 1: XBRL’s Value Proposition

<table>
<thead>
<tr>
<th><strong>Investors and Analyst</strong></th>
<th><strong>Accuracy and traceability:</strong> Data is provided with a taxonomy providing clearly defined information for data element reported on. <strong>Transparency:</strong> Access to relevant financial information is enhanced, resulting in major improvements to search, reporting and analysis functionalities. Less time is spent on data mapping and analysis and decision-making can be further prioritized.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Standard Setters</strong></td>
<td><strong>Consistency of reporting standards:</strong> The taxonomy acts as a structured dictionary, providing an explicit definition for each data element that can be shared to assure consistent interpretation.</td>
</tr>
</tbody>
</table>
| **Reporting organisations** | **Reusability:** XBRL offers a format optimized to use info on multiple reports  
|                          | **Consistency:** organisation has control over interpretation of the data by third parties |
| **Rating Agencies**      | **Accuracy:** The taxonomy specifies the meaning and rules of valid data, while automated tools can insure the compliance with the taxonomy  
|                          | **Efficiency:** By combining taxonomies and XML-based documents, automated tool can be used effectively to eliminate manual processes |


One of the main advantages of XBRL is the enhancement of accuracy and traceability of the accounting application: Data is provided with a taxonomy clearly defining information for data element reporting. As it is mandatory to name a reference to the accounting standard with each reporting elements, the investor can always see reporting lineage.

*Transparency:* Access to relevant financial information is enhanced, resulting in major improvements to search, reporting and executing analysis functionalities. Less time is spent on data mapping and analysis and decision-making can be further prioritized. Although many companies are very proactive in submitting additional communication on a voluntary basis, different reporting products are used for this: for instance, analysts’ presentations. The voluntary disclosures are additionally reported to the mandatory disclosures related to the financial statements. What is often very difficult for the reader of the financial and non-financial communication is to identify mandatory or voluntary disclosures, as they are not explicitly flagged by the company.
Consistency of reporting standards: The taxonomy acts as a structured dictionary, providing an explicit definition for each data element that can be shared to assure consistent interpretation.

**Reusability:** XBRL offers a format optimized to use information on multiple reports.

**Consistency:** organization has control over interpretation of the data by third parties.

**Accuracy:** The taxonomy specifies the meaning and rules of valid data, while automated tools can ensure the compliance with the taxonomy.

**Efficiency:** By combining taxonomies and XML-based documents, automated tools can be used effectively to eliminate manual processes.
12. Field Study on IFRS-filers listed at the NYSE

4.1 Quantitative Study

The study is based on the following data sample taken from the SEC EDGAR website. 

*Fig. 1: Summary of field study sample size*

<table>
<thead>
<tr>
<th>Forms</th>
<th>Numbers of companies</th>
</tr>
</thead>
<tbody>
<tr>
<td>10-Q</td>
<td>2840</td>
</tr>
<tr>
<td>20-F</td>
<td>1112</td>
</tr>
<tr>
<td>10-K</td>
<td>17463</td>
</tr>
<tr>
<td>6-K</td>
<td>484</td>
</tr>
</tbody>
</table>

In order to analyze a group that is as homogeneous and comparable as possible, the companies submitting Form 20-F were selected. Form 20-F is a SEC filing requirement that must be met annually by all non-domestic securities issuers who list shares on the United States (US) stock exchanges. Form 20-F requires the submission of an annual report within six months of the end of the financial year of the company or if it has changed. This sample includes 1,112 companies, which are listed on the NYSE which are non-domestic and IFRS filers, i.e. the annual report is prepared on the basis of the IFRS issued by the IASB and all filers applied the IFRS-taxonomy as base taxonomy and added company extensions, if reporting elements were not found in the base taxonomy including common practice elements.

The first metric, which was calculated is the extension rate. This is based on the number of customized extensions divided by the total number of tags. In a next step, based on the SIC code, the extension rate average was calculated to result in an industry comparison. To provide a more comparable number, the US GAAP average extension rate was calculated.
The first part of the field analysis focuses on identifying industry-specific peculiarities in the level of average percentage enhancements. The industry comparison confirms previous studies and expectations that Banks as an industry generally score the highest average deviation from the IFRS taxonomy compared to non-financial industry or non-financial sectors, which was in previous studies expected or concluded considering a smaller sample due to lack of data (Beerbaum, 2014). However, considering the extended data set, the result that the transportation industry faces on average of 49% extension rate is an outcome, which is less expected by the previous academic literature on XBRL. Based on this metric, it can also not in general be concluded that the difference between IFRS and US GAAP is only related due to the non-industry specific nature of the principles-based accounting, as for the service industry lower extension rates on average compared to US GAAP could be calculated. These first study results require a more detailed analysis of the nature of the extensions.

Within the production and trade sectors, extension rates are between 20% and 25%, whereby the average deviation, i.e. the dispersion within these sectors, is significantly lower than in the banking sector, for example, with a standard deviation of 14%.
The high variation rates within the sectors in the percentage expansions suggest that USB reflect inconsistencies in the IFRS taxonomy.

The following figure shows the banks with their percentage taxonomy extension.

*Fig. 3: The percentage taxonomy extension in the financial service industry*
The following figure shows industrial companies with their percentage taxonomy extension.

**Fig. 5: The percentage taxonomy extension in industry**

The researchers tried to apply quantitative methods for the aim of identifying common practice extensions.

The following issues were identified:

- Several companies use labels inconsistently for concepts, so that comparison of extensions is very difficult with quantitative methods and no meaningful results are achieved
- The structure of disclosures is very different, so the location of disclosures either in the notes or in the management report fluctuates, which makes comparability difficult
- The number of extensions but also the variety of label extensions makes it very difficult to find patterns applying quantitative methods

Concluding from the results of the quantitative study:

- Extensions rates are on average higher within the first interactive filings of IFRS-filers compared to US GAAP filers
- The comparison of extension rates within industries shows a different picture
  - On average extension rates are higher, however the premium has a different density
There are industries, which are outliers, as extension rates are lower under IFRS than under US GAAP.

Volatility of extension rates within industries shown with the standard deviation.
Fig. 6: Correlation between Extensions and Market Capitalization

Based on the existing literature (Barth et al., 2013) information efficiency increases the more disclosures are provided to the investor. According to Barth et al. (2011) firms with more transparent disclosures can take advantage of decreased cost of capital, as investor reluctance is mitigated Barth et al. (2013).

The research objective is to test with interactive digital whether there is a correlation between number of extensions and the market capitalization.

Fig. 6: Descriptive Statistics (Output using SPSS v26)

<table>
<thead>
<tr>
<th></th>
<th>Mean</th>
<th>Std. Deviation</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>Market_cap_in_USD</td>
<td>11.239.700.731</td>
<td>31.403.2.8.899</td>
<td>1212</td>
</tr>
<tr>
<td>Extension_rate_in_percent</td>
<td>.29.36</td>
<td>.130428142</td>
<td>1208</td>
</tr>
</tbody>
</table>

Fig. 7: Correlations (Output using SPSS v26)

<table>
<thead>
<tr>
<th></th>
<th>Market_cap_in_USD</th>
<th>Extension_rate_in_percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Market_cap_in_USD</td>
<td>Pearson Correlation</td>
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</tr>
<tr>
<td></td>
<td>Sig. (2-tailed)</td>
<td>.030</td>
</tr>
<tr>
<td></td>
<td>Sum of Squares and Cross-products</td>
<td>1194246175333580</td>
</tr>
<tr>
<td></td>
<td>Covariance</td>
<td>9861652975504382</td>
</tr>
<tr>
<td></td>
<td>N</td>
<td>1212</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>Extension_rate_in_percent</th>
<th>Market_cap_in_USD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Extension_rate_in_percent</td>
<td>Pearson Correlation</td>
<td>.062*</td>
</tr>
<tr>
<td></td>
<td>Sig. (2-tailed)</td>
<td>.030</td>
</tr>
<tr>
<td></td>
<td>Sum of Squares and Cross-products</td>
<td>308.772.759.762</td>
</tr>
<tr>
<td></td>
<td>Covariance</td>
<td>255818359.372</td>
</tr>
<tr>
<td></td>
<td>N</td>
<td>1208</td>
</tr>
</tbody>
</table>

*. Correlation is significant at the 0.05 level (2-tailed).

There is a strong correlation between extension rate and market capitalisation, as Pearson Correlation is with 0.062
8.2 Qualitative Study

In order to better understand the nature of extensions and reasoning, 10 interviews with company representatives were accomplished during 2018 and 2019. As the research project focuses on the ‘why’ and ‘how’ of extensions, we particularly rely on semi-structured interviews with actors involved in the submission of XBRL filings. Interviews with 10 direct or indirect participants of the 20-F XBRL submission were conducted between December 2018 and July 2019. The interviewees included project staff from accounting/reporting, who were involved in the project preparation of the 20-F XBRL filings. All interviews were arranged granting anonymity to individual interview partners. The interviews had a duration between 31 and 33 minutes.

Table 1 provides detailed information about the interviews.

<table>
<thead>
<tr>
<th>#</th>
<th>Department (at time of project)</th>
<th>Date</th>
<th>Duration (min.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>I1</td>
<td>Corporate Reporting</td>
<td>06 December 2018</td>
<td>(31)</td>
</tr>
<tr>
<td>I2</td>
<td>Group Finance</td>
<td>12 December 2018</td>
<td>(32)</td>
</tr>
<tr>
<td>I3</td>
<td>Corporate Communication</td>
<td>20 December 2018</td>
<td>(33)</td>
</tr>
<tr>
<td>I4</td>
<td>Corporate Reporting</td>
<td>06 January 2019</td>
<td>(33)</td>
</tr>
<tr>
<td>I5</td>
<td>Corporate Reporting</td>
<td>21 January 2019</td>
<td>(31)</td>
</tr>
<tr>
<td>I6</td>
<td>Corporate Reporting</td>
<td>05 February 2019</td>
<td>(31)</td>
</tr>
<tr>
<td>I7</td>
<td>Corporate Reporting</td>
<td>20 February 2019</td>
<td>(32)</td>
</tr>
<tr>
<td>I8</td>
<td>Corporate Reporting</td>
<td>05 March 2019</td>
<td>(32)</td>
</tr>
<tr>
<td>I9</td>
<td>Corporate Reporting</td>
<td>10 April 2019</td>
<td>(32)</td>
</tr>
<tr>
<td>I10</td>
<td>Corporate Reporting</td>
<td>14 April 2019</td>
<td>(32)</td>
</tr>
</tbody>
</table>

The interview guide was constructed to specifically learn about the interviewees’ approach to XBRL extensions, allowing flexibility to delve into promising aspects by asking follow-up questions. It is structured into three main blocks: the extension management process, the nature and reasoning of extensions and the IFRS taxonomy.
Our interview transcripts present a rich database with personal insights and perceptions of extension management in disclosure behavior from a variety of individuals involved or affected. The qualitative analysis of the data is conducted on the basis of these interview transcripts. During our reflections on the first interviews, we identified the process model of institutional entrepreneurship from Battilana et al. (2009) as a promising way to organize and make sense of our data. Therefore, we developed a coding scheme that broadly follows this model. Two authors coded the transcripts independently using NVivo and subsequently discussed their codings.

While the focus of our study is on identifying the nature of extensions in XBRL submissions of IFRS-filers listed at the New York Stock Exchange (NYSE); we also analyzed press articles and blog entries from the time after the XBRL submission. These sources reveal positive as well as negative opinions about XBRL submission. The more negative articles mostly argue that XBRL is just another regulatory burden, however, would not provide added value to the investors. The more positive ones focus on the transparency functionality of XBRL enhancing investor decision usefulness. All of them shared the opinion that digital reporting is the future.

Appendix B provides a detailed overview of the interview guide. The interview guide allowed for individual adaption of the questions to each of the interviewees. The interviews were conducted by the first author alone. Each interview, except one (I10), was audiotaped and subsequently transcribed, followed by the analysis of the data. In the interview without audio recording, the interviewer took notes for subsequent discussion with the other authors. All interviews were conducted in English and in-person, except one interview which was conducted by phone (I13).

Based on the interview, it was possible to define clusters of common characteristics and reasons for extensions, as the interview focus was explicitly on getting an expert judgement on the nature of extensions.

Given the representation issue of a principles-based taxonomy with IFRS more reporting elements are required, as majority of extensions are quasi-mandatory reflecting industry benchmarks and peer benchmarks:
The following observations could be made:

- 25% on average of the extensions be required, if the Taxonomy would further be extended by common practice elements

Nature of extensions:

- Required due to Local reporting requirements (10% of extensions)
- Voluntary disclosures also reflect uniqueness of company (5% of extensions)
- Parenthetical table (7% of extensions)
- Unstructured text disclosures require more tables to set-up
- Disclosures are more susceptible to extensions requirements, if unstructured text is required by Standards
  - Provision & Litigation
  - Goodwill Impairment and intangibles
  - Segment Reporting

In general, XBRL Accuracy and Reliability for the first IFRS-filers is still at an early stage and rather weak given the study results.

The few existing practical studies need to be broadened, as by 2020 all European listed companies will need to submit digital structured annual reports and USB's will become more prominent.

However, the principles based IFRS taxonomy has a different impact on USBs. The reason is also that there is a conflict between a principles-based accounting regime and a template-based rule-based taxonomy.

The advantages of digitized structured business reports are obvious: Improved comparability, reduced transaction costs for analysts with analytically processed financial reporting information. As a result, more accurate analyst forecasts and reduced information asymmetries can be achieved.

The practical field analysis shows that there is a lack of common practice elements, which could easily be remedied by the corresponding further development of the IFRS taxonomy. The availability of more empirical data from IFRS filers also makes it easier for taxonomy developers to address this shortcoming. In sectors such as banking, insurance and
transportation, the IFRS taxonomy does not adequately cover reporting practice. In view of ESMA’s ESEF in 2020, an extension of the taxonomy should now be sought swiftly. Future field analyzes should still carry out detailed analyses, in particular the notes.

13. Conclusions

Globalization led to an intricate set of interactive relationships between individuals, organizations and states and to an unprecedented correlation of massive global systems causing systemic risk to increase exponential. Unprecedented global interaction possibilities have made communication more complex than ever before in history as the whole has different properties than the sum of its increasing diversified parts (Centeno et al., 2013). Acknowledging that Behavioral Economics revolutionized mainstream neoclassical economics, behavioral economics insights should further be used to analyze the digital economy in order to find strategies to improve human decision making in a complex economy world.

Future research may empirically try to consolidate how behavioral economics can improve markets. Stakeholder specific facets of behavioral sciences and the different scientific disciplines’ approach towards digitalized economics could be outlined in the search for governance recommendations to regulate markets efficiently. Delineating the potential of behavioral economics to guide on the introduction of digitalization into our contemporary society portrays economics as a real-world relevant means to minimize societal downfalls and imbue trust in the digitalized world economy.

Research extensions could address the evaluation of nudging and its influence on the stability of economic markets and digitalized systems. Depicting nudging during this unprecedented time of economic change and regulatory reform holds invaluable historic opportunities for leaders on how to strengthen society by nudges but also overcome unknown emergent risks within globalized markets. In its entirety, this paper serves as very first preliminary step targeted at bestowing market actors with key qualifications to lead and to follow regulatory guidelines and accounting standards strategically in a complex digitalizing world.

In these future research endeavors, scientists and practitioners are advised to also take a critical approach to the economic analysis of the corporation. By drawing from the historical foundations of political economy, a critical stance on behavioral sciences’ use for guiding on corporate concerns could also be adopted as a heterodox spin. Behavioral Economics insights should be used for improving economic analyses to foster the accuracy and efficiency of corporate sustainability reporting. The analysis could thereby also take a heterodox economics
stance in order to search for interdisciplinary improvement recommendations of the use of economics for the corporate world. Investigations should feature a broad variety of research methods and tools to conduct independent projects in a truly multi-methodological approach. Overall, all these endeavors will help gain invaluable information about the interaction of economic markets with the real-world economy with direct implications for corporate decision makers, governance experts and financial practitioners.
14. References


Artificial Diplomacy:

A guide for public officials to conduct Artificial Intelligence

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ABSTRACT: The introduction of Artificial Intelligence (AI) in our contemporary society imposes historically unique challenges for humankind. Public officials around the world will have to adjust to the expected Artificial Intelligence (r)evolution. But how to conduct Artificial Intelligence entering our workforce, governance and society? This article attempts to give directions on the newest trend of Artificial Intelligence. Stateshuman and diplomats are invited to consider three major trends in the wake of the Artificial Intelligence (r)evolution: (1) Artificial Intelligence has gained citizenship as robots have become the first citizens in Saudi Arabia. With these ethical questions arise the question of a stratified citizenship. Robots and algorithms may only be citizens for their protection and upholding social norms towards human-like creatures but may not have full citizen privileges such as voting and holding a public office. (2) Big data revolutions coupled with computational power hold unprecedented opportunities for crowd understanding, trends prediction and civil control. Ethical boundaries may also include data breaches, privacy infringements and discrimination. Data protection through technological advancement, privacy attention through education as well as discrimination alleviation through taxation of data transfer are recommended. Within the European compound, a data freedom added to the four economic freedoms is argued. The contrast between utility of access to information and dignity in privacy is drawn in order to show differences in the American and the European regulatory approaches to handle big data. Austria, recently mentioned in the New York Times as for spearheading taxing data and information flows, currently sets international standards on handling big data. Ground-breaking work of Viktor Mayer-Schönberger on the right to delete as well as Maximilian Schrems privacy advocacy paving the way for the General Data Protection Regulation (GDPR) are given but also potential downsides of these trends mentioned. (3) Lastly, data is presented in order to make the case that the Artificial Intelligence revolution disrupting standard economic growth has already started. The divide between skill-based and unskilled-labor has never been as wide as before and 5G entering the stage is prospected to create Artificial technology hubs that further shun low-income territories from economic luxuries around the world. Paying attention to the newest trend of slowbalisation, the slowing of traditional globalization economic landmarks such as trade of goods and foreign direct investments, the market disruption will be argued to be met best by embracing new technologies while taxing revenues gained through data and the Artificial Intelligence workforce. Taxation revenues will allow the leeway to offset losses and the social costs of market distortions caused by robots and algorithms taking over in the marketplace. The European Union model of putting a social face on capitalism will be discussed to round up the need for attention to ethics to guide the currently ongoing Artificial Intelligence (r)evolution. Diplomats play a leading role in creative advocacy and humanness in service and client-relationship skills in a time of unprecedented change to artificiality.

Keywords: AI, Artificial Intelligence, Athenian city state, Capital, Democracy, Labor, Society, Slowbalisation, Workforce
1. Introduction

Artificial Intelligence (AI) poses historically unique advantages but also challenges on humankind. The article addresses the introduction of Artificial Intelligence (AI) in our contemporary society and economy with special attention to the role of governmental officials. What is the impact of robots, algorithms, blockchain and AI entering the workforce and our daily lives on the economy and human society?

Today robots that can live eternally and have no feelings, ethical questions arise whether robots, algorithms and AI should be granted citizenship and legally be considered as quasi-human beings — a technocratic and legal trend that has already started." As AI is currently reaching status of actual personhood – e.g., via citizenship and quasi-human rights applied in the Common Law but also Roman Law territories of the US and the EU – this legal personhood raises challenging legal and ethical questions.† With eternally living human-like creatures sustainability dilemmas also arise, for instance in regards to overpopulation, overconsumption of resources and natural space constraints, which will be perpetuated in a human and artificial world. Stricter guidelines and coherent, stringent rules when to switch AI off are key to an organized introduction of AI into the workforce and society.

We live in the age of big data. Yet to this day, no utility theory exists to describe the internal conflict arising from the individual preference to communicate and the value of privacy. In the age of instant communication and social media big data storage and computational power; the need for understanding people’s trade-off between communication and privacy has leveraged to unprecedented momentum. Today enormous data storage capacities and computational power in the e-big data era have created unforeseen opportunities for big data hoarding corporations to reap hidden benefits from individual’s information sharing, which occurs bit by bit in small tranches over time. Behavioral economics started to describe individuals share of information about themselves in tranches on social media and big data administrators reap by putting data together over time and reflecting the individual’s information in relation to big data of others. The decision-making fallibility inherent in individuals having problems understanding the impact of their current information sharing in

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† https://www.cnbc.com/2017/12/05/hanson-robotics-ceo-sophia-the-robot-an-advocate-for-womens-rights.html
the future was introduced as hyper-hyperbolic discounting decision-making predicament (Puaschunder, 2017). Individuals lose control over their data without knowing what surplus value big data moguls can reap from the social media consumer-workers’ information sharing, what information can be complied over time and what information this data can provide in relation to the general public’s data in drawing inferences about the innocent individual information sharer. Big data derived personality cues have recently been used for governance control purposes, such as border protection and tax compliance surveillance. Problems arise if big data insights breed discrimination – for instance if employers hire based on zip code related information or search engines provide biased information representation.

Economically, the introduction of AI breeds the potential of a market disruption, which this paper already detects in data. While the 1990ies up to 2010 were coined as the golden era of globalization, the newest trend appears to be slowbalisation. Trade and conventional globalization indicators seem to slow; yet all big data and AI related industries appear to be growing exponentially. This may be the very first sign of a market disruption, which may be at the beginning of a world of AI dominance. Already today it is estimated that AI comprises 28 percent of the US economy. Technological advances, including mobile phones and especially the internet, have contributed to globalization by connecting people all over the globe. The upcoming 5G revolution is expected to create AI power hubs that will shun away low-income countries, which face problems of reshoring trends these days (United Nations Department of Economic and Social Affairs, 2017).

Finally, we may address the question what is it that makes human humane? In the age of artificial intelligence and automated control, humanness is key to future success. Future research may draw from behavioral human decision making insights and evolutionary economics in order to outline what makes human humane and how human decision making is unique to set us apart from artificial intelligence rationality. Drawing from behavioral human decision making insights and evolutionary economics will help outline what makes human humane and how human decision making is unique to set us apart from AI rationality; AI is argued to bevalue humanness and improve the value of human-imbued unique features. Humanness as found in heuristics, decision making errors but also procreation and creativity is believed to become more valuable in a future of AI entering the workforce and our daily lives.

The findings promise to hold novel insights for future success factors for human resource management but also invaluable contributions for artificial intelligence ethics. Having parts of the world being AI-driven and others being human capital grounded is prospected to
increase the international development divide in the years to come. New growth theories may add to the standard growth driving factors – capital and labor – AI driven productivity (Puaschunder, work in progress). While in the AI-hubs human will be incentivized to become more creative and humane while AI performs all rational tasks to a maximum productivity, other parts of the world will naturally fall back as for being stuck in spending human capital time on machine-outsourcable tasks and not honing humane skills, which are not replicable by machines.

The paper is structured as follows: First, the ethical predicaments in light of AI being leveraged as citizens will be discussed with special attention to international development. Second, big data trends and ethical downfalls will be outlined. Third, first market disruptions of AI entering the workforce will be projected. The article closes with an international law prospect on regulating AI. The discussion of these trends leads to implication recommendations – such as leveraging data transfer into an European Union freedom and taxing data transfer – with special attention to public service, which hold the means to create a positive vital exchange with AI and lead on the societal transformation in the artificial age.

2. Theory

2.1 Artificial Intelligence (AI)

Artificial Intelligence (AI) is “a broad set of methods, algorithms, and technologies that make software ‘smart’ in a way that may seem human-like to an outside observer” (Noyes, 2016). The “human-like” intelligence of machines derives from machines being created to think like humans but at the same time to also act rationally (Laton, 2016; Russell & Norvig, 1995; Themistoklis, 2018). AI is perceived as innovative technology or as the sum of different technological advances as the privilege of the private, technological sector with little — if any — public regulation (Dowell, 2018).

In today’s economy, robots and algorithms now taking over human decision-making tasks and entering the workforce but also encroaching our private lives, currently challenges legal systems around the globe (Themistoklis, 2018). The attribution of human legal codes to AI is one of the most groundbreaking contemporary legal and judicial innovations. Until now, legal personhood has only been attached directly or indirectly to human entities (Dowell, 2018). The detachment of legal personhood from human being now remains somewhat of a paradox causing an extent of “fuzziness” of the concept of personhood (Barrat, 2013; Solum, 1992, p. 1285). As AI gets bestowed with quasi-human rights, defining factors of human personhood
will need to be adjusted (Dowell, 2018). Human concepts, such as morality, ownership, profitability and viability will have different meaning for AI. The need for redefining AIE has therefore reached unprecedented momentum.

As a predicted trend, the co-existence of AI with the human species is believed to change the fundamental concepts of social, political and legal systems. AI has already produces legal creations and will do so even more in the near future, through its developing autonomy. In addition, the technology leading to AGI and ASI is already present, posing moral and legal dilemmas about who should control it and under what terms (Themistoklis, 2018). The emergence of AGI and ASI will necessitate the attribution of some extent and of some type of legal personhood, bearing rights and obligations. AI will not be most probably an exact replication of human intellect behavior (Themistoklis, 2018). “[U]ltimately, robots’ autonomy raises the question of their nature in the light of the existing legal categories – of whether they should be regarded as natural persons, legal persons, animals or objects – or whether a new category should be created, with its own specific features and implications as regards the attribution of rights and duties” (Committee on Legal Affairs 2016, p. 5). Behavioral economists add the question whether AI and robots should be created to resemble human beings’ decision making with fast thinking and fallible choices or rather be targeted at perfect rationality and slow thinking (Kahneman & Tversky, 1979). General conscious is strived for so that AI possesses consciousness, which it can evolve and enhance on the basis of its own critical reflection and assessment of external factors (Themistoklis, 2018). A lower level of autonomy exists if an entity can demonstrate such consciousness at a narrow field or can self-evolve and self-adapt to external influences, thus reaching decisions “of its own,” without being conscious of its intelligence as such (Themistoklis, 2018). As AI emerges as new types of intellect capacities coupled with human-like emotional features, they are attributed a legal personhood in order to ensure to be comprehended correctly and to avoid unfair treatment, towards humans as well (Themistoklis, 2018). Artificial entities are currently gaining human or quasi-human status in the Western and Arab worlds in forming an intellectual autonomy of the entity (MacDonald, 2016). For instance, in Saudi Arabia the first female robot got a citizenship in 2017 and the robot appears to have more rights than a human female in Saudi Arabia. With the rise of AI persons, their eternal life poses ethical challenges in light of overpopulation and evolutionary perfection, which could crowd out human fallibility if determining merit-based eternal life.

With citizenship and quasi-humanness being attributed to AI, the power relation between human and AI will need to be defined. Should AI be granted full citizenship rights,
the problem of overpopulation occurs, since there is the possibility of infinitely living AI. In a human-led evolution, AI will have to be switched off for various reasons, such as malfunction but also merit-based efficiency calculus. If now AI is considered as quasi-humane and granted citizenship rights, switching off AI becomes a legally problematic.

2.2 Artificial citizens

While there is currently cutting-edge writing about the potential emergence of an AI personhood as well as concern over the merge of AI with cyberspace that might lead to the breach of the relationship between legal personhood and nation state sovereignty and a nomenclature is emerging on legal characterizations of different levels of AI development; hardly any information exists about the full legal capacity of living AI with citizenship (Beerbaum & Puaschunder, 2018; Hildebrandt, 2013). From the theoretical standpoint, the eternal longevity of AI contradicts the fundamental concept of fairness in death, as a general condition for all. From the practical standpoint, the international community is currently urged to think on the basis of global commons in terms of AI and AI eternal life potentials contributing to overpopulation. Thereby global commons theories may be tabbed on, which primarily offer guidance for a regulatory framework, which establishes control “…for the benefit of all nations” and refer to space constraints (Clancy, 1998; Puaschunder, forthcoming; Tsagourias, 2015).

With AI entering human society and being considered as quasi-human and granted citizenship, the ethical question arises, what kind of citizen AI are? Should AI be considered as full citizens, we run into the problem of overpopulation as discussed. In addition, AI dominance of physical and computational power creates risks of AI outperforming and eventually dominating human. With this scenario in mind, a legal power hierarchy should be established that grants a predominance of human over AI that allows human to benefit from AI but also ensures that dignity in the treatment of AI is upheld for the sake of breeding a generally favorable and amicable climate in society.

When considering the enormous physical and longevity advantages AI hold over human, a natural dominance of AI over humankind is implied. In order to ensure that human lead AI and are not subordinated, a society should be established, in which robots gain quasi-human rights but may not have the same powers and rights as human beings. In the earliest form of democracy in the ancient Athenian city state, different classes of citizenship existed.

The first known democracy developed around the fifth century BC in the Greek city-state of Athens, which featured the first government by its people, in which the supreme power
was vested in the people and exercised directly by them or by their elected agents under a free electoral system. The ancient Athenian democracy became an important source for 18th-century revolutionaries’ intellectual background during the American, French and other continental European revolutions. State constitutions around the globe and over time, political speeches and writings about nation states and society reflect the core principles conveyed in the ancient Athenian city state democratic model, which become a model for shaping civilization throughout the world. To this day, a democracy accounts for the most advanced political order in an egalitarian society (Vlassopoulos, 2009).

In 507 BC, the Athenian leader Cleisthenes introduced a system of political reforms called *demokratia* or rule by the people to ensure security, stability and prosperity to the entire community. Key features of democracy are equality, accountability, citizen participation, rule of law, political tolerance, transparency, economic freedom and a multi-party political system. In the ancient Athenian democracy model, not every citizen had the right to vote, run for office and participate in political discussions. Yet to all, the democracy was meant to protect and uphold dignity of all people. Therefore, the Athenian democracy bestowed a favorable climate in society without political equality of all citizens.

As a direct democracy, citizens voted directly on legislation and executive bills. However, participation in democracy was not open to all residents but limited to adult, male citizens excluding women, foreign residents and slaves. In ancient Athens, only male Athenian citizens who had completed their military training had the right to vote and only about 10 to 20% of inhabitants actually participated in governmental decision making. Women had limited rights and privileges, restricted movement in public and were legally segregated from men. Also excluded from voting were citizens whose rights were under suspension – foremost for failure to pay debt to the city. Only descendants from two Athenian parents could claim Athenian citizenship. Citizenship could also be granted by the assembly and sometimes given to large population groups as a reward for service to the state. As slavery was widespread in Athens and seemed to have developed the city state, the ancient Athenian democracy is attributed to economically be based on slavery, which allowed the general public to devote privileged amounts of time to political life.

The ancient Athenian democracy model has become a torchbearer of ideas and values that have inspired major democracy ever since. In the Aegean basin, fragmented into a myriad isles and vales, it was impossible for political power to be concentrated in the hands of one ruler or even one group of rulers (Ministry of Culture and Science of Greece, 1985). As for spatial limitations the outward expansion was restricted, the internal development to form a just state
become more sophisticated. The democratic asty ancient society was founded on the beliefs of knowledge, self-reflection and autonomy. The early success of the democratic movement prompted other representatives from different cultures to study and promote the core principles as a driving force of human progress and advancement throughout the ancient world (Ministry of Culture and Science of Greece, 1985). Democracy was meant to change the world in its concept of parallel promotion of rationality and dynamic evolution of states based on social consciousness. Out of the Greek antiquity, Western Civilization sprouted as the hallmark of any Western society thereafter. Deeply rooted in the vital spirit of inquiry and trust in deeper human values, Hellenism as a symbol of rational self-awareness accounts for the cultural and historic forerunner of the modern world. The School of Hellas was founded on learning by experienced destiny. The democratic system of government of Athens did promote the cultivation of the mind, in fitting harmony with care of the body, in a vital climate of freedom of speech, rule of law and art as an essential pillar of life (Ministry of Culture and Science of Greece, 1985). To this day therefore the ancient Athenian city state stands for the first governmental trace of imbuing human integrity and dignity into statehood followed by the principle of humanism.

The ancient Athenian political ideals in the post-Classical era establish the foundations of the history of political thought, around which all subsequent political discourse has been articulated. The ancient Athenian governmental formation and the operational aspects of Classical Athenian democracy is also documented in more detail than all other political systems in the Classical antiquity (Ministry of Culture and Science of Greece, 1985).

Herodotus first defines democracy as concept to imbue equality, the principle of democracy and political responsibility in society (Ministry of Culture and Sciences of Greece, 1985). Democracy should enable equality before the law as offices are assigned by rolling many, the holders are accountable for what they do therein and the general assembly arbitrates on all counsels. The first idea of democracy was the wish to increase the power of the multitude as for believing in “all good lies in the many.” (Herodotus in Ministry of Culture and Science of Greece, 1985, p. 15). Thucydides added meritocracy for the accession of public offices and tolerance in private life to complete Athenian democracy. The patriotic relation to the city to be ready to lay down one’s life for the city, when death comes unperceived, in battle and in the confidence of patriotism, is described (Thucydides in Ministry of Culture and Science of Greece, 1985, p. 16). Oresteia adds that only one’s political awareness and incorporation within the schema of the Classical city in the final democratic patterning of its institutions could save from archaic standstill (Oresteias in Ministry of Culture and Science of Greece, 1985, p. 15). The
Athenian democratic model inspired the late Middle Ages Florentine humanism in the first half of the fifteenth century and Renaissance civic humanism (Baron, 1966; Skinner, 1978). The ancient Athenian democracy also became the model to justify the condemnation of absolutism in the sixteenth century in France but was also imbued in the political discourse of England of that time (Fink, 1945; Franklin, 1969; Pocock, 1975). The return of the Athenian model is evident in the works of John Milton and James Harrington as well as the Anglo-American revolutions of 1776 and the French revolution of 1789 (Milton, 1644 and Harrington, 1656 in Ministry of Culture and Science of Greece, 1985, p. 25; Wood, 1969). Montesquieu, Rousseau and Alexis de Tocqueville’s political through in the eighteenth century of the Enlightenment and the following revolutions were connected with the ancient Greek models of the state as an alternative form of government, which could secure political legitimacy (Hampson, 1983; Kitromilides, 1982; Montesquieu, 1734). The Greek democracy also included political virtue and public spirit. The Athenian constitution served as pole of political imagination and inspiration as a hallmark of the best of government imbuing an inherent ideological over-determination and rationalization of public will (Mill, 1861). The citizens of the ancient Greek republics, however, did not enjoy personal freedom (Montesquieu, 1748 in Ministry of Culture and Science of Greece, 1985, p. 22).

The current legal citizenship of AI has given the ancient Athenian democratic values remarkable immediacy and relevance. The Athenian form of direct democracy does not only serve as an example of not all citizens being allowed to vote being a feasible governmental structure but also – as for its direct character – as a forerunner of electronic democracy. A future world with AI blended into society could structure the human – AI relation based on the ancient Athenian city state societal composition, in which different classes of citizenship lived together in harmony. As in the ancient Athenian democracy model, not every citizen should have the right to vote, run for office and participate in political discussions. AI could become citizen, yet not be allowed to vote, run for office and participate in political discussions. Yet to all, AI and human, democracy and citizenship is meant to protect and uphold dignity of all people and AI.

In order to create a more inclusive democracy than the ancient Athenian direct electronic democracy may be introduced, in which voters vote on a political agenda featuring different spectra of choices (e.g., libertarian versus state-controlled, pro-against immigration…) and the mean of their choices then gets processed by algorithmic choice of programs to be enacted by politicians. Algorithms could thereby compute the standard choice of politicians representing different agenda based on historical information and aid to inform politicians about the
outcomes of several choices in the past. AI and algorithms hold the computational power and data calculus capacity to do so. This would ensure closer accuracy of political will resembling collective choice and enable to reap AI benefits for political choice, while ensuring human to stay in charge but enhanced by artificial benefits. This integration of AI in form of an advisory role to governments could enable AI access to democracy as a compromise without AI having direct voting rights.

2.3 Artificial sustainability

The novel predicament between eternity and overpopulation hence calls for revising legal codes for killing, which would allow switching off AI at a certain point to curb overpopulation and harmful behavior. But how to argue legally the right to kill? And when to pull the plug? How do we switch quasi-human intelligence off when misbehaving or if AI life has become a burden that cannot be borne by society? How to balance robots living forever in light of overpopulation and finite resources in light of international development and population control? We may want to draw on the ethics of dying and virtues of killing as well as suicide literature to answer these novel questions. The proposed frame offers innovative insights for legal conducts but also overlapping generations relationships. The nature of algorithms and digital technology being global demands for an international response, potentially via international law supremacy principle.

While there is currently cutting-edge writing about the potential emergence of an AI personhood as well as concern over the merge of AI with cyberspace that might lead to the breach of the relationship between legal personhood and nation state sovereignty and a nomenclature is emerging on legal characterizations of different levels of AI development; hardly any information exists about the eternal living of AI (Beerbaum & Puaschunder, 2018; Hildebrandt, 2013). From the theoretical standpoint, the eternal longevity of AI contradicts the fundamental concept of fairness in death, as a general condition for all. From the practical standpoint, the international community is currently urged to think on the basis of global commons in terms of AI and AI eternal life potentials contributing to overpopulation. Thereby global commons theories may be tabbed on, which primarily offer guidance for a regulatory framework, which establishes control “…for the benefit of all nations” and refer to space constraints (Clancy, 1998; Puaschunder, forthcoming; Tsagourias, 2015).

Regarding limited space, longevity and eternal life appears problematic. Humankind may face tough decisions whether or not to have AI proceed and what kind of developments to
flourish and what to extinct. In what cases should we consider to switch off AI? In 1950, Isaac Asimov introduced the idea robot to (1) not injure a human being or, through inaction, allow a human being to come to harm. (2) A robot obeying the orders given it by human beings except where such orders conflict with the first law. (3) A robot must protect its own existence as long as such protection does not conflict with the first or second law. So in the cases of overpopulation and harm emerging from AI, algorithms and robots can be considered to be switched off. But when to stop AI?

An economic killing market mechanism may be natural market selection via price mechanisms and the falling rate of profit. Regarding prices, natural supply and demand mechanisms will always favor innovation with a higher price and following supply of goods lead to a price drop. The falling rate of profit is one of the major underlying features of business cycles, long-term booms and downturns (Brenner, 2002, 2006a, b). Capitalism is thereby described as competitive battle for innovation and reaping benefit from first-market introductions. Once followers enter the market, profit declines, leading eventually to market actors seeking novel ways to innovate in order to regain a competitive market advantage and higher rates of profit. Thereby industries and innovations fade and die off. Such a natural market evolution is also likely to occur with AI innovations, which will determine which AI traits will remain and which ones will fade off (Puaschunder, forthcoming). Apart from soft market mechanisms that may lead to AI evolution, what are the cases when AI should be shut down or switched off or – in the case if AI personhood – be killed?

Errors and Safety: The main and leading concern about any new and emerging technology is to be safe and error free (Meghdari & Alemi, 2018). Therefore, sufficient and numerus tests on health and safety must be performed by developers and/or well-known independent sources before rolling out any technology onto the marketplace and society (Meghdari & Alemi, 2018). In robotics, the safety issue mainly centers around software and/or hardware designs (Meghdari & Alemi, 2018). Even a tiny software flaw or a manufacturing defect in an intelligent machine, like a smart car or a social robot, could lead to fatal results (Meghdari & Alemi, 2018). When these deviations occur and especially when they are harmful to the human community but also to other AI species, the faulty AI should be terminated. With regard to the risk of robotic malfunctions and errors, product legal responsibility laws are mostly untested in robotics (Meghdari & Alemi, 2018). A usual way to minimize the risk of damage from social robots is to program them to obey predefined regulations or follow a code-of-ethics (Meghdari & Alemi, 2018). Ethical codes for robotics are currently needed and should become formed as a natural behavioral law to then be defined and codified as law. Laws but
also an ethical understanding to terminate AI, algorithms and robots in case of impairment and harm are needed.

Morals, Ethics, and the Law: As social robots become more intelligent and autonomous and exhibit enough of the features that typically define an individual person, it may be conceivable to assign them responsibility and use them in social, educational, and therapeutic settings (Meghdari & Alemi, 2018). In the currently ongoing research on the integration of computers and robotics with biological corpse it is found that a cognizant human brain (and its physical body) apparently has human-rights; hence, replacing parts of the brain with artificial ones, while not harming its function, preserves those rights (Meghdari & Alemi, 2018; Warwick & Shah, 2014). Also, consider a handicapped person featuring an electronic robot arm that commits a crime. It becomes obvious that half-robot-human beings should be considered as human and robots as quasi-human beings. Meghdari & Alemi (2018) speculate that at some point in the future, we may face a situation in which more than half of the brain or body is artificial, making the organism more robotic than human, which consolidates the need of special robot-rights and attributing (quasi)-human rights onto robots. When considering robots as quasi-human beings, their termination appears legally questionable and ethically challenging, requiring revisiting laws as legitimation to kill a likewise species as well as ethical consensus on the virtue of killing (Puaschunder, forthcoming).

The legal argumentation may draw on justifiable homicide as outlined in criminal law cases – such as prevention of greater harm to innocents during an imminent threat to life or well-being in self-defense. According to the United Nations Universal Declaration of Human Rights, Article 3 states that everyone has the right to life, liberty and security of person and most nations’ policy allows for some degree of leniency for self-defense, which reduces charges. Potentially excusing conditions common to most jurisdictions include wartime, when the person’s death is inflicted by the effect of a lawful arrest or prevention of lawfully detained person’s escape, quelling riot or insurrection, when the use of force is “no more than absolutely necessary.” Some countries deem it lawful for a citizen to resort to violence to protect valuable property and there is the “heat of the moment” defense argument, in which the defendant deemed to have lost control through provocation. Doctrine of necessity allows, for example, a surgeon to separate conjoined twins and killing the weaker twin to allow the stronger twin to survive. While fetuses are considered as unborn children in the US, the right to an abortion was upheld in the US legal system as exemption from prosecution (Roe v. Wade, 1973). Several countries, such as the Netherlands, Belgium, Switzerland, Japan, and the U.S. states of Oregon and Washington, allow both active and passive euthanasia by law, if justified. Where the person
concerned is to be arrested for an offense referred to in Schedule 1 or is to be arrested on the ground of having committed such an offense, and the person authorized under this Act to arrest or to assist in arresting him cannot arrest him or prevent him from fleeing by other means than killing him, the killing shall be deemed to be justifiable homicide. If any arrestor attempts to arrest a suspect and the suspect resists the attempt, or flees, or resists the attempt and flees, when it is clear that an attempt to arrest him or her is being made, and the suspect cannot be arrested without the use of force, the arrestor may, in order to effect the arrest, use such force as may be reasonably necessary and proportional in the circumstances to overcome resistance or to prevent the suspect from fleeing: Provided that the arrestor is justified in terms of this section in using deadly force that is intended or is likely to cause death or grievous bodily harm to a suspect, only if he or she believes on reasonable grounds (§7 Judicial Matters Second Amendment Act 122 of 1998).

In light of overpopulation and harmful behavior of AI, switching off artificial life, which is currently be granted quasi-human status, will need to be argued legally and supported ethically. Killing in terms of the death penalty is justified legally in the 5th (and the 14th) amendment that states “no person shall be deprived of life, liberty, or property without due process of law,” while the eighth amendment prohibits “cruel and unusual punishment.” Killing in terms of harmful behavior of AI can be grounded on similar legal reasons to ensure that no AI harms the collective. Overpopulation claims leading to the need to take AI partially off the grid more lead to philosophical sources that argue for individual’s free will to choose to live or die (Critchley, 2015).

Apart from self-defense, suicide may also serve as legally justified argument for switching off AI, if artificial life is programmed to terminate itself when harmful in such way that AI causes injury to a human being or, through inaction, allow a human being to come to harm. A robot not obeying the orders given it by human beings except where such orders conflict with the first law. We could argue that AI should stay alive at whatever the cost in virtue of killing AI, when turning harmful.

Suicide has been tabooed for most part of history and propagated to be a religious sin or classified as a psychological disorder (Critchley, 2015). Yet the human gift of reflection and search for meaning in life or death could leverage into an asset in the AI evolution in the decades to come. Suicide understood as neither a legal nor a moral offence but as right to death bestowed upon human beings in their self-conscious reflection may be extended as a virtue of killing in the artificial age, when human beings will have to decide what AI should stay alive
and what AI be taken off the grid. Human will thereby become the rulers of the forthcoming AI evolution.

The ethical imperative of switching AI off may be found in David Humes’ saying ‘No man ever threw away life, while it was worth keeping’ (Critchley, 2015, p. 15f.). Hume’s point is that when life has become a burden that cannot be borne, one is justified in taking it. In this argumentation line, if AI life has become a burden that cannot be borne by society, society is justified in taking AI’s life. Critchley (2015) recommends reflective compassion based on empathy and introspection, but we may also need foresight and inclusion of future externalities. In the artificial age, AI may therefore be programmed with a constitution for suicide. Also in Seneca we find that when a human life no longer flourishes, one being permitted to end it (Critchley, 2015). The Stoic tradition argued that suicide is a legitimate act and an honorable gesture of farewell from a state of unbearable pain, whether physical or psychical (Critchley, 2015). In this sense, AI’s death may be argued to be justified when AI imposes a state of unbearable pain unto others. Religious stances that suicide is wrong because only God having moral authority over human lives and thus us being property of God could be subsumed into a condition to legitimize human having authority over AI and thus being our property, in which we can decide what developments to maintain and which ones to switch off in a human-led AI-evolution. This human-led evolution is believed to revolutionize modern society and civilization. Killing AI – or determining what AI development should survive – may therefore become an act of self-defense or legalized suicide.

As in a suicide note that speaks as final communication to the descendants, algorithms that are forced to be switched off should also store information on the reason that terminated them and be conserved in a blockchain that serves to educate the network about malfunction and malpractice. This piece of publicity should serve as disciplinary and signal function. In suicides with guns, people aim at the head not the heart – while both head and heart stop function in human thereafter, in AI, we may program that the brain function, that is constant storage of information and adaptive reprogramming and actions get switched off but some positive parts remain intact to be reprogrammed (Critchley, 2015). Death will end the incoherence in creating a beautifully benevolent AI structure, which we may see as evolutionary cleansing of destruction coming out of AI. The death algorithm button will bestow coherence to the human-led evolution of AI. The voluntary switch to shut AI off will be the pejorative of
human and dominating privilege of human over AI. There will be a beauty to death, the stillness, the rest and the finally stopped negative character of AI evolution (Puaschunder, forthcoming).

The virtue of killing could also be grounded on Viktor Mayer-Schönbergers “right to be forgotten,” which ensures data privacy through automated deletion of contents after a certain period and grants individuals rights to have their data been destroyed (Puaschunder, forthcoming; forthcoming). In this line, we may argue a “right to destroy” and program AI to stop itself should it incur hurt, damages and losses to humankind. However, the implementation of this right is still in infancy and hindered by questions of what court is responsible for an as such claim. As a legal subsumption, we may speculate that individuals may be granted a ‘right to terminate’ and can order for robots to be switched off if causing harm to them. As the ‘right to be forgotten’ law can be overruled by concern for public safety, this may also apply to the right to terminate. Thereby it deserves mentioning that safety differs around the world and also expected safety standards (Puaschunder, forthcoming). All these developments are prospected to lead to an AI-evolution, in which human are meant to select the process what AI should survive or be killed. Key decision maker thereby divert favorable traits and developments from unfavorable. But who should determine what should survive, human or AI? A question that can be answered by sorting out the legal power relation between AI and human.

2.4 Big data

In the age of instant communication and social media big data; the need for understanding people’s tradeoff between communication and privacy has leveraged to unprecedented momentum. For one, enormous data storage capacities and computational power in the e-big data era have created unforeseen opportunities for big data hoarding corporations to reap hidden benefits from individual’s information sharing.

In the 21st century, the turnover of information and the aggregation of social informational capital has revolutionized the world. In the wake of the emergence of new social media communication and interaction methods, a facilitation of the extraction of surplus value in shared information has begun. Computational procedures for data collection, storage and access in the large-scale data processing have been refined for real-time and historical data analysis, spatial and temporal results as well as forecasting and now casting throughout recent decades. All these advancements have offered a multitude of in-depth information on human biases and imperfections as well as social representations and collective economic trends.
Contemporary big data challenges comprise of governance and surveillance risk alongside confidentiality and security breaches (Boilson, Staines, Connolly, Davis & Connolly, 2019). Existing computational infrastructures can readily cope with the storage of big data, but the specific challenge for the EU is the lack of a suitable large-scale European infrastructure and methods of secure data distribution in a cross-border setting (Georgatos, Ballereau, Pellet, Ghanem, Price & Hood, 2013). A common and reasonable concern for patients is the risk of the misappropriation of information that may adversely affect personal circumstances, including insurance coverage and employment.

Robust scientific and data processing methodologies involve the validation of algorithms, filtering systems for noisy data, managing biases, and the selection of appropriate data streams. Methodological robustness is an ethical, not just a scientific requirement. Limited resources are wasted based on defective results and incomplete analyses, but also because trust in health care systems and professionals can be undermined by the use of misleading or inaccurate results (Boilson et al., 2019; Vayena, Mastroianni & Kahn, 2015).

The digital age has brought about unprecedented opportunities to amalgamate big data information that can directly be used to derive inferences about people’s preferences in order to nudge and wink them in the nudgitalist’s favor. In today’s nudgital society, information has become a source of competitive advantage. Technological advancement and the social media revolution have increased the production of surplus value through access to combined information. Human decisions to voluntarily share information with others in the search for the humane pleasure derived from communication is objectified in human economic relations. Unprecedented data storage possibilities and computational power in the digital age, have leveraged information sharing and personal data into an exclusive asset that divides society in those who have behavioral insights derived from a large amount of data (the nudgers) and those whose will is manipulated (the nudged).

The implicit institutional configuration of a hidden hierarchy of the nudgital society is structured as follows: Different actors engage in concerted action in the social media marketplace. The nudgital-brokers are owners and buyers of social media space, which becomes the implicit means of the production. In the age of instant global information transfer, the so-called social media industrialist-capitalist provides the social media platform, on which the social media consumer-workers get to share information about their life and express their opinion online for free. In their zest for a creation of a digital identity on social media platforms,
a ‘commodification of the self’ occurs. Social media consumer-producer-worker are sharing information and expressing themselves, which contributes to the creation of social media experience (Puaschunder, 2018).

The hidden power in the nudgitalist society is distributed unevenly, whereby the social media consumer-workers are slaves, who receive no wages in return for their labor, falling for their own human nature to express themselves and communicate with one-another. Social media consumer-workers also engage in social media expression as for their social status striving in the social media platforms, where they can promote themselves. By posing to others in search for social status enhancement and likes, they engage in voluntary obedience to the social media capitalist-industrialist who sells their labor power product of aggregated information to either capitalists or technocrats. The social media consumer-worker’s use value is inherent in their intrinsic motivation to satisfy a human need or want to communicate and gain respect from their community. The use value of the commodity is a social use value, which has a generally accepted use-value derived from others’ attention and respect in the wake of information sharing in society. The social media provider gives the use value an outlet or frame, which allows the social media consumer-worker to express information, compare oneself to others and gain information about the social relation to others. The consumer-laborer thereby becomes the producer of information, releasing it to the wider audience and the social media industrialist. This use value only becomes a reality by the use or consumption of the social media and constitute the substance of consumption. The tool becomes an encyclopedic knowledge and joy source derived from the commodity (Puaschunder, 2018).

But the use of social media is not an end in itself but a means for gathering more information that can then be amalgamated by the social media capitalist-industrialist, who harvests its use value to aid nudgers (Marx, 1867/1995). It is a social form of wealth, in form of social status and access to knowledge about others that the use value materializes on the side of the industrialist in the exchange value. For the social media industrialist, who is engaged in economic and governmental relations, the exchange value of the information provided by his or her social media consumer-laborers is the information released and consumption patterns studied. In exchange this allows to derive knowledge about purchasing and consumption patterns of the populace and therefore creates opportunities to better nudge consumers and control the populace. With the amalgamated information, the social media industrialist-capitalist can gain information about common trends that can aid governmental officials and technocrats in ensuring security and governance purposes. Further, the social media platform
can be used for marketing and governmental information disclaimers as media influences politics (Calvo-Armengol, de Marti & Prat, 2015; Prat, 2017; Prat & Strömberg, 2013).

Exchange value is a social process of self-interested economic actors taking advantage of information sharing based on utility derived from consuming the social media. The social media industrialist-capitalist can negotiate a price based on the access to the social media consumer-worker’s attention and sell promotion space to marketers. The exchange value of the commodity of information share also derives from the subjective perception of the value of amalgamated data. Exchanged information can be amalgamated by the social media industrialist-capitalist and traded to other market actors. Exchange value is derived from integrating everything the worker is and does, so both in his creative potential and how he or she relates to others. Exchange value also stems from the exchange of the commodity of amalgamated information that enables an elite to nudge the general populace. The amalgam of information as a premium signals the average opinion and how the majority reacts to changing environments, which allows inferences about current trends and predictions how to react to market changes.

Underlying motives may be the humane desire for prestige and distinction on both sides – the industrialist-capitalist’s and the consumer-worker’s. From the industrialist-capitalist’s perspective, monetary motives may play a role in the materialization of information; on the consumer-worker’s side it is the prestige gained from likes, hence respect for an online identity created (Ali & Benabou, 2016). Individuals may experience a warm glow from contributing to the public good of common knowledge (Ali & Benabou, 2016). The benefits of the superior class are the power to nudge, grounded on the people’s striving for prestige and image boosts. Impression management and emotions may play a vital role in seducing people to share information about themselves and derive pleasure for sharing (Evans & Krueger, 2009; Horberg, Oveis & Keltner, 2011; Lerner, Small & Loewenstein, 2004). Social norms and herding behavior may be additional information sharing drivers (Paluck, 2009). The realization of prestige stems from creating a favorable image of oneself online, which signs up the workers in a psychological quasi-contract to provide more and more information online and in a self-expanding value. Prestige is also gained in the materialization of information as asset by the capitalist-industrialist, who reaps the surplus value of the commodification of the self of the consumer-worker based on socio-psychological addiction to social media (Marx, 1867/1995; Soros, 2018). In the wake of an addiction to social media, users get distracted from profitability for their own terms and experience a loss of autonomy bit by bit. The social media capitalist-industrialist therefore increases their capital based on the social media consumer-worker’s
innocent private information share. The social media capitalist-industrialist also accumulated nudgital, the power to nudge.

This information sharing opens a gate for the social media provider to reap surplus value from the information gathered on social platforms and to nudge the social media consumer-producers or resell their amalgamated information to nudgers. Crucial to the idea of exploitation is the wealth or power of information in the digital age. While classical economic literature finds value in organizational hierarchy to economize transaction costs, the age of big data has opened a gate to reap disproportional benefits from individual data and information sharing. Surplus of information can be used to nudge in markets and by the force of governments. To acknowledge social media consumers as producers leads to the conclusion of them being underpaid workers in a direct wage labor exploitation. Surplus gravitates towards the social media owning class. Information becomes a commodity and commodification a social product by the nature of communication. Commodification of information occurs through the trade of information about the consumer-worker and by gaining access to nudge consumer-workers on social platforms. The transformation of a labor-product into a commodity occurs if information is used for marketing or governance purposes to nudge people. In the contemporary big data society, the nudged social media user therefore end up in a situation where they are unwaged laborers, providing the content of entertainment within social media, whereas the social media industrialist-capitalist, who only offers the information brokerage platform and is not subject to tax per information share, reaps extraordinary benefits from the amalgamated information shared. Not just labor power but the whole person becomes the exchange value, so one could even define the consumer-worker as utility-slave.

The technological complexity of digital media indicates how interrelated social, use and exchange value creation are. All commodities are social products of labor, created and exchanged by a community, with each commodity producer contributing his or her time to the societal division of labor. Use value is derived by the consumer-worker being socially related insofar as private consumption becomes collective. The use value thereby becomes the object of satisfaction of the human need for social care and want for social interaction. The use value becomes modified by the modern relations of production in the social media space as the consumer-worker intervenes to modify information. What the consumer-worker says on social media, for the sake of communication and expression but also in search for social feedback, is confined by the social media industrialist-capitalist, who transforms the use value into exchange value by materializing the voluntary information share by summing it up and presenting it to nudgers, who then derive from the information marketability and nudgitability of the consumer-
workers. All information sharing has value, or labor value, the abstract labor time needed to produce it. The commodification of a good and service often involves a considerable practical accomplishment in trade. Exchange value manifests itself totally independent of use value. Exchange means the quantification of data, hence putting it into monetary units. In absolute terms, exchange value can be measured in the monetary prices social media industrialist-capitalists gain from selling advertisement space to nudging marketers but also to public and private actors who want to learn about consumer behavior in the digital market arena and influence consumers and the populace (Shaikh, 2016). The exchange value can also be quantified in the average consumption-labor hours of the consumers-workers. While in the practical sense, prices are usually referred to in labor hours, as units of account, there are hidden costs and risks that have to factored into the equation, such as, for instance, missing governmental oversight and taxing of exchange value.

Overall, there is a decisive social role difference between the new media capitalist-industrialist and the social media consumer-worker. The social media provider is an industrialist and social connection owner, who lends out a tool for people to connect and engage with. As the innovative entrepreneur who offers a new media tool, the industrialist also becomes the wholesale merchant in selling market space to advertisement and trading information of his customers or workers, who are actively and voluntarily engaging in media tools (Schumpeter, 1949). The social media consumers turn into workers, or even slaves if considering the missing direct monetary remuneration for their information share and since being engaged in the new media tool rather than selling their labor power for money in the market place holds opportunity costs of foregone labor. While selling their commodity labor power, the social media consumer-workers are also consumers of the new media tool laden information, which can be infiltrated with advertisement. The social media capitalist-industrialist not only reaps exchange value benefits through access to people’s attention through selling advertisement space, but also grants means to nudge the consumers into purchasing acts or wink the populace for governance authorities (Marx, 1867/1995). The social media capitalist-industrialist thereby engages in conversion of surplus value through information sharing into profit as well as selling attention space access and private data of the consumer-workers.

When the new media consumer-workers’ amalgam of provided information gets added up to big data sets, it can be used by capitalists and governance specialists. Over time the nudgital society emerges, as the nudging social media industrialist-capitalists form a Gestalt of several bits and pieces put together about the nudged social media consumer-producer-worker-
slaves. Information gets systematically added up providing invaluable behavioral insights. Information in its raw form and in amalgamated consistency then becomes channeled from the broad working body on social media into the hands of a restricted group or societal class. This circulation of information and the distribution into those who provide a medium of information exchange and those who exchange information that then forms a society in those who nudge and those who are nudged implying an inherent social class divide.

In the nature of exchange, nudgital becomes an abstract social power, a property claim to surplus value through information. Value can be expropriated through the exchange of information between the industrialist-capitalist and the nudgitalist. Exchange value has an inherent nature of implicit class division. Exchange value represents the nudgitalists’ purchasing power expressed in his ability to gain labor time that is required for information sharing as a result of the labor done to produce it and the ability to engage in privacy infringements. The social media industrialist-capitalists implicitly commands labor to produce more of data through social nudging and tapping into humane needs to communicate and express themselves, whereby he or her use a reacting army of labor encouraging information share through social gratification in the form of likes and emoticons (Posner, 2000). The reacting army of labor is comprised of social media users, who degrade into hidden laborers that are not directly compensated for their information share and cheerleading others to do the same. The nudgital society’s paradox is that information sharing in the social compound gets pitted against privacy protecting alienation.

In all these features apparent becomes the rise of the monopolistic power of giant IT platform companies (Soros, 2018). For instance, Facebook and Google are believed to control over half of all internet advertising revenue (Soros, 2018). While these companies initially played an important innovative and liberating role, by now it has become apparent that they also exploit the social environment (Soros, 2018). Social media companies know how people think and influence them to behave in a certain way without their users having insights or being aware of the hidden influence (Soros, 2018). As George Soros points out at the World Economic Forum 2018, this has far-reaching adverse consequences on the functioning of democracy, particularly on the integrity of elections. It is believed that social media can prime how people evaluate politicians consciously and unconsciously based on the available content (Iyengar & Kinder, 1987). The profitability of these corporations is based on the absence of direct payments for the information shared to the social media users or taxation being imposed
on the IT giants (Soros, 2018). While these platforms were initially set up to make the world more flat, by now they have turned to monopoly distributors of the public good knowledge. Acknowledging these monopolistic IT giants as public utilities will help making them more accountable and subject to stringent regulations, aimed at preserving competition, innovation and fair and open universal access to information (Soros, 2018).

The nudgitalist exploitation also holds when technocrats use heuristics and nudges to create selfish outcomes or undermine democracy. Ethical abysses of the nudgital society open when the social media is used for public opinion building and public discourse restructuring. Social media not only allows to estimate target audience’s preferences and societal trends but also imposes direct and indirect influence onto society by shaping the public opinion with real and alternative facts. Government officials’ gaining information about the populace that can be used to interfere in the democratic voting process, for instance in regards to curbing voting behavior or misinformation leading people astray from their own will and wishes. The social intertwining of the media platform and the democratic act of voting has been outlined in recent votes that were accused to have been compromised by availability heuristic biases and fake news. Data can also be turned against the social media consumer-worker by governance technocrats for the sake of security and protection purposes, for instance, social media information can be linked together tax verification purposes.

Governments have been transformed under the impact of the digital revolution. Instant information flow, computational power and visualization techniques, sophisticated computer technologies and unprecedented analytical tools allow policy makers to interact with citizens more efficiently and make well-informed decisions based on personal data. New media technologies equip individuals with constant information flows about informal networks and personal data. Novel outreach channels have created innovative ways to participate in public decision making processes with a partially unknown societal impact at a larger scale, scope and faster pace than ever before. Big data analytics and the internet of things automate many public outreach activities and services in the 21st century. Not only do we benefit from the greatly increasing efficiency of information transfer, but there may also be potential costs and risks of ubiquitous surveillance and implicit persuasion means that may threaten democracy. The digital era governance and democracy features data-driven security in central and local governments through algorithmic surveillance that can be used for corporate and governmental

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purposes. Open source data movements can become a governance regulation tool. In the sharing economy public opinion and participation in the democratic process has become dependent on data literacy. Research on the nudgital society holds key necessary information about capacity-building and knowledge sharing within government with respect for certain inalienable rights of privacy protection. The nudgital society’s paradox that information sharing in the social compound gets pitted against privacy protecting alienation requires an ideological superstructure to sustain and tolerate hidden exploitation.

All these features are modern times phenomena as the technology and big data creating computational power is currently emerging. The transferability of the commodity of information itself, hence the big data amalgamation over time and space to store, package, preserve and transport information from one owner to another appears critical. The legal leeway to allow private information sharing implicitly leads to individuals losing their private ownership rights to the commodity of information upon release on social media and the right to trade information. The transferability of these private rights from one owner to another may infringe on privacy protection, human rights and humane dignity upholding mandates.

Not only pointing at the ethical downfalls of the nudgital society, also defining social media users as workers is of monumental significance to understand the construction of the nudgital society and bestow upon us social media consumer-workers labor rights. The technical relationship between the different economic actors are completely voluntary and based on trust (Puaschunder, 2015b). The creation of use value is outsourced to the community (e.g., in likes) and the share of information about the workers from the social media capitalist to the market or nudgitalists remains without a clear work contract and without protection of a labor union. The worker-employer relationship needs to be protected and a minimum wage should settle for the market value of the worker producing during the working day. Wages would be needed to maintain their labor power of the workers minus the costs of the production. Unpaid laborers should not only be compensated for their opportunity costs of time but should enjoy the workers’ privilege of right to privacy, prevention of misuse of the information they share and have the right to access to accurate information but also protection from nudging in the establishment of the right to voluntary fail.

The nature of making profit from information in exchange value is questionable. Information exchange of the industrialist-capitalist is different than neoclassical goods and services trade insofar since for the capitalist-industrialist making money off privacy and the consumer-workers share of information without knowledge and/or control over the recipient of the amalgamated mass of privacy released. Workers are never indifferent to their use value and
their inputs may also produce unfavorable outcomes for them. The exchange value will sell for an adequate profit and is legally permitted, yet it can destroy the reputation and standing as well as potentially the access of the individual to country entrance if considering the proposed social media information release mandate at border controls. Care must be taken for privacy infringement and the product of amalgamated big data and how useful it is for society.

Lastly, big data holds the potential to grasp trends and deriving inferences over large groups instantaneously. However, the luxury of making sense and predicting from big data also opens possibilities of discrimination. Jumping into conclusions by deriving inferences from big data appears to hold the downside of e-gentrification and discriminatory bias. For instance, endeavors to lay open data about the performance of medical doctors is blocked as for holding the disadvantage that with a mapping of medical performance in a certain area, comes the possibility to rule out employees based on their medial prevalence and health status likelihood. Big data search algorithms are also reported to hold discriminatory biases that do not give as much credit to underrepresented groups as they would deserve in a fair representation.

3. 2.5 AI market disruption

Globalization led to an intricate set of interactive relationships between individuals, organizations and states. Unprecedented global interaction possibilities have made communication more complex than ever before in history as the whole has different properties than the sum of its increasing diversified parts. Electronic outsourcing in the age of artificial intelligence is likely to increase and with this trend a possible digital divide in the 21st century. In the light of growing tendencies of globalization, the demand for an in-depth understanding of how information will be shared around the globe and artificial intelligence hubs may evolve in economically more developed parts of the world has gained unprecedented momentum. Another predictable trend in the wake of the artificial intelligence revolution will feature time. Artificial intelligence with eternal life and 24/7 productivity capacities will change tact around the globe with eternally living creatures on the market that outperform human beings and can live eternally (United Nations Department of Economic and Social Affairs, 2017).

As the most novel trend, AI, robots and algorithms are believed to soon disrupt the economy and employment patterns. With the advancement of technologies, employment patterns will shift to a polarization between AI’s rationality and humanness. Robots and social machines have already replaced people in a variety of jobs – e.g. airports smart flight check-in
kiosks or self-check-outs instead of traditional cashiers. Almost all traditional professional are prospected to be infused with or influenced by AI, algorithms and robotics. For instance, robots have already begun to serve in the medical and health care profession, law and – of course – IT, transportation, retail, logistics and finance, to name a few. Social robotics may also serve as quasi-servants that overwhelmingly affect our relationships. Already, social robots are beginning to take care of our elderly and children, and some studies are currently underway on the effects of such care (Alemi, Meghdari & Saffari, 2017). Not only will AI and robots offer luxuries of affordability and democratization of access to services, as they will be – on the long run – commercially more affordable and readily available to serve all humanity; but also does the longevity potential of machines outperform any human ever having lived (Hayes, 2018). However, the new technology also comes with the price of overpopulation problems and the potential for misuse and violent action. Just like many other technologies, robots could be misused for wars, terrorism, violence and oppression (Alemi et al., 2017; Puaschunder, forthcoming).

AI’s entrance in society will revolutionize the interaction between humans and AI with amply legal, moral and social implications (Kowert, 2017; Larson, 2010). Autonomous AI entities are currently on the way to become as legal quasi-human beings, hence self-rule autonomous entities (Themistoklis, 2018). AI is in principle distinguished between weak AI, where “the computer is merely an instrument for investigating cognitive processes” and strong AI, where “[t]he processes in the computer are intellectual, self-learning processes” (Wisskirchen, Biacabe, Bormann, Muntz, Niehaus, Jiménez Soler & von Brauchitsch, 2017, 10). Weak AI is labeled as Artificial Narrow Intelligence (ANI) while strong AI is further classified into Artificial General Intelligence (AGI) and Artificial Super Intelligence (ASI).

The emergence of robotics technology is developing much quicker than previously thought. Robots are anticipated to soon be as ubiquitous as computers are today (Meghdari & Alemi, 2018). Society has long been concerned with the impact of robotics technology from nearly a century ago, when the word “Robot” was devised for the first time (Cápek, 1921; Meghdari & Alemi, 2018). The EU Committee on Legal Affairs (2016, p. 4) holds that “[U]ltimately there is a possibility that within the space of a few decades AI could surpass human intellectual capacity in a manner which, if not prepared for, could pose a challenge to humanity’s capacity to control its own creation and, consequently, perhaps also to its capacity to be in charge of its own destiny and to ensure the survival of the species.” AI mimicking human intellect could soon surpass humans intellectually but also holistically breaking the barrier of human controlled-automization (Schuller, 2017; Themistoklis, 2018).
literature about robots features cautionary accounts about insufficient programming, evolving behavior, errors, and other issues that make robots unpredictable and potentially risky or dangerous (Asimov, 1942/1950, 1978, 1985; Meghdari & Alemi, 2018). “Observe, orient, decide, act” will therefore become essential in the eye of machine learning autonomy and AI forming a new domain of intellectual entities (Armstrong & Sotala, 2012, p. 52; Copeland, 2000; Galeon & Reedy, 2017; Marra & McNeil, 2013). The uncertainty surrounding AI development and self-learning capabilities give rise to the need for guarding AI and an extension of the current legal system to cope with AI (Themistoklis, 2018; Puaschunder, forthcoming).

With the advancement of technology, social robots have found broader applications in the private and public sectors, such as educational and cultural affairs, games and entertainment, clinical and rehabilitation, nursing of children and/or elderly, search and rescue operations (Meghdari, Alemi, Shariati & Zakipour, 2018). For example, social robots such as ASIMO, Nao, iCub, ARASH, and RASA have been developed for “Edutainment” or “educationentertainment” purposes. They aid the study of cognition (both human and artificial), motion, and other areas related to the advancement of robotics serving our society (Meghdari & Alemi, 2018). In addition, a few medical and healthcare toy-like robots, such as PARO, which looks like a baby seal, or ARASH, which is a humanoid, have been designed for therapeutic purposes such as reducing distress, stimulating cognitive activity, teaching specific subjects, and improving socialization (Meghdari, Shariati, Alemi & Vossoughi, 2018). Similarly, Sharif University of Technology’s socially assistive robot RASA has been developed to help coach and teach Persian Sign-Language to Iranian deaf children (Meghdari, Alemi, Zakipour & Kashanian, 2018). Personal care and companion robots are increasingly being used to care for the elderly and children, such as RI-MAN, PaPeRo, and CareBot (Meghdari & Alemi, 2018; Puaschunder, forthcoming).

In recent years, robotics technology has extended its applications from factories to more general-purpose practices in society – for instance, such as the use of robots in clinical and rehabilitation, nursing and elderly care, search and rescue operations (Meghdari & Alemi, 2018). Social robots have become clinical and educational assistants for social interventions, treatment, and education such as language trainings but also assistance with children with disabilities like autism, down syndrome, cancer distress, hearing impairment, etc. (Meghdari et al., 2018). Initial investigations clearly indicate that social robots can play a positive role in the improvement of children’s social performance, reduction of distress during treatments, and enhancing their learning abilities (Meghdari & Alemi, 2018). Surprisingly, although not too
hard to imagine, relationships of a more intimate nature have not quite been satisfied by robots yet (Meghdari et al., 2018; Veruggio, 2005). The use and entrance of robots, algorithms and AI is expected to continue and may interfere with standard market behavior and societal trends, such as globalization.

Globalization sprang from America’s sponsorship of a new world order in 1945, which allowed cross-border flows of goods and capital to recover after years of war and chaos. With the collapse of the Soviet Union in 1989 and the end of the Cold War in 1991, the world became even more interconnected. With the fall of the communist bloc, which had previously been intentionally isolated from the capitalist West, global market economy integration embraced the world. Trade and investment increased, while barriers to migration and to cultural exchange were lowered. The European Union but also free trade agreements, such as the North American Free Trade Agreement (NAFTA), which the governments of the United States, Canada, and Mexico signed in 1992, removed barriers to the free flow of people, goods, and services, thereby facilitating greater trade, investment, and migration across national borders in an unprecedented way (Profita, in speech).

The golden age of globalization from 1990-2010 changed the world: Immigration increased from 2.9 to 3.3 percent of the world’s population and global trade grew from 39 percent of GDP in 1990 to 58 percent last year. Asia became part of the globalized upon China’s entry into the WTO in 2001, which created a model of offshoring manufacturing to countries based on cost efficiency variances, primarily labor costs. The Washington Consensus praised to lift billions of people out of poverty in Asia, Latin America and Africa via economic growth (Profita, in speech).

During the last 17 years, China increased its GDP from $1.2 trillion to $11 trillion, a sign of historically unprecedented growth for a country of this size. A similar phenomenon occurred in India, Vietnam and other countries. This model of globalization has also supported the growth of large multinational companies that have been able to offshore production processes and increase directors’ and shareholders’ income, as well as those of their employees and suppliers (including SMEs). Furthermore, it has been excellent for consumers, enabling everyone to access an endless number of products at competitive prices. Commerce soared as the cost of shifting goods in ships and planes fell, phone calls got cheaper, tariffs were cut and finance liberalized. Business went gangbusters, as firms set up around the world, investors roamed and consumers shopped in supermarkets with goods from around the globe. As never before in history, traveling had become available to the general populace at affordable prices. The number of refugees today has reached all-time highs. If not moving oneself, free data
services provided on the ‘window to the world’ internet, allowing everyone to consume the globe anytime anywhere. Yet, globalization also brought about negative consequences and unforeseen shadows of the invisible hand.

When America took a protectionist turn two years ago, provoking dark warnings about the miseries of the 1930s; yet they were, once again, first in sensing and acting on a contemporary detected, most novel worldwide trend: Slowbalisation! United Kingdom followed shortly with surprising everyone with voting for Brexit. Adapting a term coined in 2015 by Adjiedj Bakas, who called “slowbalization” the trend that globalization has given way to a new era of sluggishness. Slowbalisation speaks to the fact that since the 2008 World Financial Recession, Asia’s growth rates are slowing, cross-border investments, trade, bank loans and supply chains have been shrinking or stagnating relative to world GDP.

Globalization has slowed in the past decade after the 2008 global recession. Trade has fallen from 61 percent of world GDP in 2008 to 58 percent now. If these figures exclude emerging markets (of which China is one), it has been flat at about 60 percent. The capacity of supply chains that ship half-finished goods across borders has shrunk. Intermediate imports rose fast in the 20 years to 2008, but since then have dropped from 19 percent of world GDP to 17 percent. The march of multinational firms has halted as the global corporate share of global profits of all listed firms has dropped from 33 percent in 2008 to 31 percent. Long-term cross-border investment by all firms, known as foreign direct investment (FDI), has tumbled from 3.5 percent of world GDP in 2007 to 1.3 percent in 2018. As cross-border trade and companies have stagnated relative to the economy, so too has the intensity of financial links. Cross-border bank loans have collapsed from 60 percent of GDP in 2006 to about 36 percent. Excluding rickety European banks, they have been flat at 17 percent. Gross capital flows have fallen from a peak of 7 percent in early 2007 to 1.5 percent. Since 2008 the share of economies converging from emerging economies to catch up with the rich world in terms of output per person using purchasing-power parity has fallen from 88 percent to 50 percent. Politically, where we seemed to have spent decades after two world wars to break down walls and pacify Europe in a Union, we are now back to building barriers faster than before (Profita, in speech).

Yet, this is not the end of the story, as some globalization features still show rising integration. Technological advances, including mobile phones and especially the internet, have contributed to globalization by connecting people all over the globe. The World Wide Web links billions of people and devices, providing innumerable opportunities for the exchange of goods, services, cultural products, knowledge, and ideas. The internet connectivity and volume of data crossing borders has risen by 64 times, according to McKinsey, people appear to enjoy
experiences abroad and consume data. Building dreams and hope based on information shared online, migration to the rich world has risen over the past decade. International parcels and flights are growing fast, almost exponentially.

The downturn of the Chinese economy and other emerging economies, as well as the contraction of investment in the US during recent years, may explain part of this deceleration – but not all of it. Technological and political factors could indicate a market disruption that has already begun and currently echoes in globalization versus slowbalisation occurring parallel to each other. The currently described trend of slowbalisation could just be a forerunner of the AI revolution market disruption about to take place that will create a world very different to the one we know. As exhibited in Graph 1, there appears to be a market polarization between industries that continue on a globalization path and industries that are slowing down. For instance, international parcel volume, migration, cross-border bandwidth and international air travel are still rising, partially exponentially it appears. Traditional globalization hallmarks, such as trade in goods and services, imports, multinational profits, Foreign Direct Investment
(FDI) flows, stock of cross-border bank loans, gross capital flows, share of countries catching up and S&P 500 sales abroad tend to be on a declining growth slowbalisation path.

Graph 1: Slowbalisation and globalization trends

Currently ongoing is also the trend of reshoring, the counterpart of offshoring. When global value chains were spread around the globe in the last decades; from 2010 on there has been a tendency to focus on the local and bring back the production closer to the end user. For instance, technological development is bringing production and manufacturing closer to the end user. The most obvious example is energy and a prospective attempt to decentralize renewable energy generation. Your solar panel becomes more productive if energy need not be stored but...
simply can be shared with your neighbor when not needed it. This will break the dependence of United States and Europe third-party countries. So does the need to transport millions of barrels of oil (55 percent of world trade in 1970) and tons of coal. The United States – the world’s leading energy consumer – is prospected to become energy independent in oil and natural gas. This has a large impact on world trade and geopolitics. Given its growing energy independence, the US may reduce its role as guarantor of maritime security. A large part of its interest in this role, which it has played since 1945, has been to ensure the transport of fossil fuels to the West. Hopefully, this may also bring about an era of peace in oil rich territories, such as Syria and the Middle East.

There is a projected impact of robotic development on international trade. As the Fourth Industrial Revolution, robots are expected to become more efficient and affordable. Practices such as offshoring manufacturing to cheap labor cost countries will most likely decline. Reshoring will bring back production to where goods and services are actually and finally consumed. Robots are expected to be more accurate, can work 24/7, and less demanding than human workers. Millions of employees in the East may lose their jobs over the next few decades, substituted by robots in the West. In addition, advances in 3D printers may soon make it possible to substitute large factories with much smaller ones, closer to the consumer, where the manufacturing process is simplified thanks to the reproduction of models. New materials could be manufactured near the consumer, in order to substitute natural materials that need to be transported from distant mines and deposits. Trade links within regional blocs may increase and blocks become more homogenous, both in Europe and Asia. Slowbalisation and reshoring are thereby expected to widen the gap between the rich and the poor.

All these polarizing trends may be a first sign of the Artificial Intelligence revolution disrupting standard economic growth has already started. The divide between skill-based and unskilled-labor has never been as wide as before and 5G entering the stage is prospected to create Artificial technology hubs that further shun low-income territories from economic luxuries around the world. Paying attention to the newest trend of slowbalisation, the slowing of traditional globalization economic landmarks such as trade of goods and foreign direct investments, the market disruption will be argued to be met best by embracing new technologies while taxing revenues gained through data and the Artificial Intelligence workforce. Taxation revenues will allow the leeway to offset losses and the social costs of market distortions caused by robots and algorithms taking over in the marketplace.

A negative externality of slowbalisation are political fractions, foremost visible in Brexit and right wing movements rising featuring support of tariffs, protectionism and reversing
offshoring in re-shoring traditional production processes. Leaders of political parties have gained in votes by enforcing tariffs and abandoning certain trade agreements in the hope to bring back jobs outsourced. TPP and TTIP have been replaced with trade wars, sanction and political upheaval in the wake of Brexit, which have negative impacts on growth and less production. Overall, blocking the process of globalization is believed to radically change the rules of the game for companies, workers and investors, which can be alleviated by diplomats and public servants.

3. Discussion

Overall the ongoing research plays an important role in the evaluation of AI’s entrance into the workforce and our daily lives. Depicting this unprecedented time of economic change and regulatory reform holds invaluable historic opportunities for capturing AI’s influence on the stability of economic markets and societal systems. Global governance policy makers can snapshot AI’s potential in the digital age and bestow market actors with future-oriented foresighted. The following discussion is aimed at guiding a successful AI and robot implementation to lower systemic economic market downfalls with attention to the changes implied in the wake of the ongoing artificial intelligence revolution. Market and societal policy recommendations for global governance experts on how to strengthen society by AI but also overcome unknown emergent risks within globalized markets and bestow market actors with key qualifications in a digitalized world are endeavored in future research.

As for the introduction of human-like robots, the wealth of literary sources and archaeological data about the ancient Athenian city state should not create the illusion that we have a fully comprehensive knowledge of how society was fully structured, what the state existentially meant to the ancient Athenian citizens themselves and how they perceived the network of social classes within which they functioned as public personas. There is the danger of misunderstanding testimonial or overlooking unheard oppressed voices who have become silenced over the course of history and time. In addition, a majority of ancient sources view the Athenian democracy through the eyes of its opponents (Jones, 1953). Novel insights on today’s diversified populace may thus pay special attention to discrimination and unseen representations due to biases.

By shedding light on these risks of the social media age and the implicit dynamism of capitalism forming around information, a social formation of social media workers’ right can be heralded. Social media user-workers should be defined to hold inalienable rights to privacy
and be forgotten, to be protected from data misuse of information they share, they should be granted the right to access of accurate information and – in light of the nudgitalist audacity – the right to fail.

3.1 People’s right to privacy and to be forgotten

The transformation of a use value into a social use value and into a commodity has technical, social and political preconditions. Information gets traded and ownership of privacy transferred in information sharing. Upon sharing information on social media, the consumer-worker bestows the social media capitalist-industrialist with access to previously private information. The social media capitalists then transforms the information into use value by offering and selling the bundled information to nudgitalists, who then can draw inferences about certain consumer group’s preferences and guide their choices.

Overall, the nudgital society leads to a dangerous infringement upon the independence of individuals in their freedom of choice and a social stratification into those who have access to the amalgamated information of social media consumer-workers. There is a trade-off between communication and privacy in an implicit contract of the use of personal data. Power is exercised through the accumulation of information, including the quality of insatiability of social media consumer-workers to constantly upload information and the social media capitalist-industrialist reaping profits from selling it.

Social media thereby reveals to hold a sticky memory that allows storage of information in the international arena eternally. Privacy and information share regulations depend on national governments. For instance, in the commodification of privacy, the EU is much more beneficial to consumers than that of the US. Data protection and commercial privacy are considered as fundamental human rights to be safeguarded in Europe. Europe appears in a better position, since it does not have any IT platform monopolistic giants of its own (Soros, 2018). Not only does Europe have much stronger privacy and data protection laws than America. EU law also prohibits the abuse of monopoly power irrespective of how it is achieved (Soros, 2018). US law measures monopoly by the inflated price paid by customers for a service received, which is impossible to prove when the services are free and there is no utility theory of privacy and information sharing that captures the value and price of information (Soros, 2018). In contrast, the US approach towards commercial privacy focuses on only protection the economic interests of consumers. Current privacy regulations are considered as not sufficient in targeting actions that cause non-economic and other kinds of harm to consumers.
Privacy and information sharing guidelines appear to be culturally-dependent phenomena. Information about privacy boundary conditions can be obtained from the transatlantic dialog between the US and Europe on privacy protection. While in Europe health care data is public, in Canada, there is a public interest to make the data more public. The EU’s privacy approach is based on Article 7 and 8 of the Charter of the Fundamental Rights of the EU, which grants individuals rights to protection, access and request of data concerning him or herself. European privacy is oriented around consumer consent. The 2016 EU General Data Protection Regulation (GDPR) ruled the right to be forgotten under certain circumstances. Consumer consent and dealing with incomplete, outdated and irrelevant information is legally regulated. GDPR establishes regulatory fines for non-complying companies applicable to foreign companies whose data processing actions are related to ‘good and services’ that they provide to data subjects in the EU, so also including US companies operating in the virtual space accessible by European citizens. The EU privacy approach offers member states flexibility in data management for national security and other exceptional circumstances but also protects civilians from common potential circumstances for data abuse; while there are standardized data management policy procedures regardless of a companies’ country-of-origin or operational locations. The EU’s privacy approach has higher regulatory costs, is not specified by sectors and the right to be forgotten still needs enforcement validity.

The US approach to privacy is sector specific. Commercial privacy is pitted against economic interests and neither seen as civil liberty nor as constitutional right. US privacy is regulated by the Federal Communications Commission (FCC) and the Federal Trade Commission (FTC). Overall in the US, the general definitions of unfair and deceptive give the FTC a wider scope for monitoring and restricting corporate privacy infringements. The FTC has a wide variety of tools for data protection, yet the responsibility is split between the FTC and the FCC, which increases bureaucratic and regulatory costs and limits industry oversight.

So while the EU framework treats commercial privacy as a basic human right leading to a more extensive protection of individual’s privacy including data collection, use and share; the EU framework is also non-sectoral and allows sovereign nation states to overrule common data management policies for the sake of national security and protection. The US framework lacks a centralized privacy regulation approach, yet is sector but split regarding oversight in the domains of the FCC and FTC.
3.2 People’s right to prevent misuse of information they share

By US standards, social media is required by the FTC to ask users for permission if it wants to alter its privacy practices. Under Section 5 of the FTC Act that states that (1) unfair practices are causes or is likely to cause substantial injury to consumers or cannot reasonably be avoided by consumers; and (2) deceptive practices are practices that likely are misleading or actually misleading the consumer.

In August 2016, the decision of WhatsApp to share more user data – especially user phone numbers – with Facebook in order to track customer-workers’ use metrics and refine targeted user advertising also opened a gate to discriminatory pricing. This decision faced a huge backlash in the EU, where data sharing was ordered to be halted and Germany deemed these practices as illegal. In the US the Federal Trade Commission (FTC) began reviewing joint complaints from consumer privacy groups. The recent WhatsApp data sharing is a possible violation of this requirement since it only allowed consumers to opt out of most of the data sharing while lacking clarity and specificity. WhatsApp’s restrictive opt out option and incomplete data sharing restrictions were argued to be perceived as unfair and deceptive (Tse, in speech, March 25).

3.3 People’s right to access to accurate information

Traditional media studies advocate for independence of the media. Commercial motives have ever since raised doubts about reputation and credibility of outlets (Prat & Strömberg, 2013). Technological shocks have always created new opportunities but also opened gates to novel downfalls in the communication realm. Novel technologies for information sharing but also monitoring of communication are prone to significant change in the nature of communication. In such technological leaps, attention to privacy is recommended (Ali & Benabou, 2016).

In the nudgital society, profits appear in the circuit of information and take on different forms in the new media age. The possibility of trading information and reaping benefits from information sharing of others determines the unequal position of people in society. The possession of knowledge stems from the surplus derived from the activity of production, hence the information share of social media consumer-producers. This confrontation of labor and consumption is not apparent in the modern marketplace. The class division remains quite invisible in the implicit workings of the system.

The nudgitalist act becomes problematic when being coupled with infiltration with fake news and alternative facts that curb democratic acts, e.g. manipulating voting behavior.
Ethical questions arise if there is a transparency about the capitalist’s share of information and a fair social value benefits distribution among the capitalist and the worker. In addition, under the cloak of security and protection, privacy infringements by sharing information with the nudgitalist is questionable. In the political domain, knowledge has been acknowledged as a public good. Voters who spend resources on obtaining information to keep their government accountable produce a positive externality for their fellow citizens (Prat & Strömberg, 2013).

By outlining the nudgital market procedures and acknowledging knowledge as a public good, fairness in the distribution of gains should be accomplished and privacy infringing information sharing limited, curbed by taxation or guided by the legal oversight. Access to information about the storage, preservation, packaging and transportation of data is non-existent, demanding for more information about behind-the-scenes’ social media conduct. Transforming private information from use value to exchange value is an undisclosed and therefore potentially problem-fraught process that holds implicit inequality within itself. From a societal standpoint, also the missing wealth production in the social media economy appears striking. Thereby the dangers of information release and transfer and the hidden exchange value accrued on the side of the media innovator are left unspoken. The importance of shedding light on such, though, is blatant as for stripping the populace from inalienable rights of privacy while reaping benefits at the expense of their susceptibility. Nudges in combination with misinformation and power abuse in the shadow of subliminal manipulation can strip the populace from democratic rights to choose and voluntary fail (Benabou & Laroque, 1992).

As a policy response to the negative implications of the nudgital society, taxing IT giants may enable to raise revenue for reducing cost and noise in collecting political information. For instance, by making news freely available without commercial interruptions. A mixture strategy could be introduced, in which consumers are given the choice to either choose a free account that releases information or pay for a private account, which restricts third party use of their data.

Facebook has recently acknowledged the rise of fake news having an impact on voting behavior and therefore roles out a bottom-up accuracy check mechanism. Truthfulness appears hard to quantify on social media since truth is not easily verifiable and integrity of information embodied in prices is missing through the free information exchange on social media. Reputation and social self-determination mechanism appear as alternate sources of

information accuracy checks in the absence of classical price mechanisms (Benabou & Laroque, 1992).

3.4 People’s right to choose and fail

In the personal information sharing age and nudgital society, attention must be given to privacy and human dignity. The nudgital society opens a gate to gain information about consumer choices and voting preferences. The uneven distribution of key information about people’s choices opens a gate to tricking people into choices. The so-called nudging attempt though raises ethical questions about human dignity and the audacity of some to know better what is better for society as a whole. Because governance is a historical process, no one person can control or direct it, thereby creating a global complex of governance connections that precedes the individual administration. Structural contradictions describe the class struggle between the nudged in opposition to the nudgers in the nudgital society. Since societal actors who involuntarily are nudged are separated from an active reflection process when being nudged, the moral weight is placed on the nudger. Though democratically elected and put into charge, the nudgers checks-and-balances of power seem concentrated and under disguise through the middle man of social media capitalist-industrialists who collect information. Rather focusing on how to trick people into involuntary choices, the revelations should guide us to demand to educate people on a broad scale about their fallibility in choice behavior.

In a self-enlightened society, people have a right to voluntary fail. Nudging implies a loss of degrees of freedom and disrespect of human dignity, hence the nudgital society will lead to structural contradictions. Their rational thinking and voluntary engagement in governmentally-enforced action becomes divorced from rational reflection. No one entity should decide to control or direct other’s choices, thereby creating a global complex of social connections among the governed for the sake of efficiency for the common good. The economic formation of human decision making in society should never precede the human voluntary decision.

There is an inherent inequality of social positions, manifested primarily in the respective capacities of reaping benefit from amalgamated information, which leads to a disparity of social position. The distribution of power leads to a natural order of human activity, in which the nudgers are in charge of nudging the populace. Moral value is separated from economic value and hence placing the fate of the populace into the arms of the behavioral economists raises problems of lack of oversight and concentration of objective economic value rule in the nudgital society.
Future studies should define the value that data has to individuals and data sovereignty in the international context. When people share information, they should be informed to consider what the benefit and value from information sharing is for them and what the benefit for social media industrialists-capitalists is. The sovereignty of data and the human dignity of privacy should become debated as civic virtual virtue in the 21st century. Individuals should be informed that sharing data is a personal security risk, if considered to be asked for social media information upon entry of a country.

Overall, with the communication on the nudgital society just having started, it remains on us to redesign the apparatus of production in ways that make the infringement on private information through the natural tendency to share information, care about others and express oneself. Governance crises are rooted in the contradictory character of the value creation through big data. The formation of value is a complex determination and we still need more research to understand the deep structures of market behavior in the digital age.

3.5 **Big data protection**

Data protection of privacy can be achieved by technological advancement – such as encrypted data transfer – or privacy attention training in standard educational efforts. Discrimination alleviation could be pursued via taxation to raise the funds for offsetting those who lose from the AI revolution and misrepresented data online. Austria, recently mentioned in the New York Times as for spearheading taxing data and information flows and could thereby set international standards on handling big data and revenue generation from data transfer. As of 2019, the Austrian Government announced its plan to introduce a new digital tax, with a focus on fair taxation of the digital economy. New rules are part of larger tax reform plans with a focus to reduce taxes for low-income individuals and smaller businesses. The budget is currently on track for a surplus and shall remain at a surplus also after the reform. As background, the European Commission proposed in March 2018 new tax rules for fair taxation of digital business activities in the European Union (EU) which included a 3% tax on certain revenue from digital activities. In December 2018, the EU Member States were unable to reach agreement on a digital tax approach for the entire EU. As the EU has not yet agreed on an approach for Member States, the Austrian Government, a coalition of Conservatives and the Freedom Party, now wants to introduce a country-specific digital tax. New levies on internet advertising, online retailers and sharing platforms would potentially add up to about €200m of additional tax revenue. The Austrian Government announced its plan to introduce a 3% tax on internet advertising revenue for all groups with worldwide revenues of at least €750m and
Austrian revenues of at least €10m. The Digital Tax is aimed to generate revenues from internet activities. This measure aims to levy taxes on international groups that currently pay minimal taxes in Austria according to the Austrian Government. The third measure aims at the taxation of online sharing platforms e.g., in tourism. Operators would be obliged to report certain information to the tax authorities which is relevant to levy taxes. In addition, operators could be held liable to enforce reporting obligations. At the moment this is only an announcement of the Austrian Government; a legislative bill has not been published. Enactment of the new provisions is subject to future legislative action. While this law will only apply to Austria, within the European Union, a data freedom added to the four economic freedoms should be enacted within the European Union. While the standard freedoms ensure free movement of capital, labor, services and goods, data transfer has not been specifically addressed for ensuring a harmonious and smooth economic transfer. Data, as the other globalization hallmarks, should become subject to market protection and data transfer enabled through sophistication of methods and means of data transfer within the European Union.

3.6 Liability

As for liability problems stemming from misconduct caused by AI, robots or algorithms, we may draw from Roman Law conduct of slavery. In order to uphold economic trade and financial stability, slaves, who were allowed to engage in market actions on behalf of their masters, were endowed with funds that their masters had to book out in advance, in order to mentally depart with them in case there is a fraud. This would make it easier for the trade partner of the slave to engage and trust in action as for having peace of mind that the funds are somewhat out of the master’s realm of restitution. If slaves committed crimes, they could be given to the person who was harmed, who would then have the right to determine the verdict over the slave’s punishment. This ensured that slaves would somewhat behave in light of severe punishment prospects and revenge (The Oxford Encyclopedia of Ancient Greece and Rome, 2010. These century-old social conduct norms and Roman Law codifications could be used to determine the AI evolution and when to switch off AI. If there is harm, then the person who got harmed, or the interest group of the harmed should be alerted and become part of the decision whether or not AI should be switched off or reprogrammed. Financial burden of robots and AI should be borne by the inventors of the algorithms behind robotics and AI. The risk should be integrated into the accounting by forward booking out of costs in order to ensure harm caused by robots, AI or algorithms is covered. At least the necessity of insurances but

“https://www.bmf.gv.at/steuern/Digitalsteuerpaket.html
also taxation of benefits and revenues reaped from AI should be enacted in order to offset for potential risks and losses surrounding or stemming from AI entering the workforce and society (Gamauf, 2009).

3.7 AI market disruption

Lastly, data was presented in order to make the case that the Artificial Intelligence revolution disrupting standard economic growth has already started (Puaschunder, forthcoming). The divide between skill-based and unskilled-labor has never been as wide as before and 5G entering the stage is prospected to create Artificial technology hubs that further shun low-income territories from economic luxuries around the world. Paying attention to the newest trend of slowbalisation, the slowing of traditional globalization economic landmarks such as trade of goods and foreign direct investments, the market disruption will be argued to be met best by embracing new technologies while taxing revenues gained through data and the Artificial Intelligence workforce (Puaschunder, work in progress). Taxation revenues will allow the leeway to offset losses and the social costs of market distortions caused by robots and algorithms taking over in the marketplace. The European Union model of putting a social face on capitalism is prone to adjust AI market innovations with a social flavor and imbue ethics to guide the currently ongoing Artificial Intelligence (r)evolution. Diplomats play a leading role in creative advocacy and humanness in service and client-relationship skills in a time of unprecedented change to artificiality.

4. Conclusion and future prospects

The article presented a first introduction of three major trends that may shape tomorrow’s society: Artificial intelligence becoming quasi-human legal status, a predicament between information sharing and privacy in the big data age and first market disruption signs of AI entering the workforce large scale.

As a next research step, a stringent hypotheses testing of the presented problems are recommended. For instance, future research projects featuring a multi-methodological approach will help gain invaluable information about the actual performance and behavior regarding AI legal status, privacy in the big data surveillance age and actual market data backtesting of market disruptions through AI.

Following empirical investigations could employ a critical survey of the intersection of analytic and behavioral perspectives to legal aspects of AI, decision making on ethical dilemmas arising of AI and taxation reception of the new internet taxation efforts. Literature
discussion featuring a critical analysis how to improve e-literacy should be coupled with e-education and enhancement of e-ethicality. Research should be directed towards a critical analysis of the application of legal, behavioral and economic approaches. Interdisciplinary viewpoints and multi-method research approaches should be covered in the heterodox economics readings but also in a variety of independent individual research projects. Research support and guidance should be targeted at nurturing interdisciplinary research interests on artificial governance in the public affairs sphere.

Future studies should describe what companies and institutions constitute the complex system that helps establishing the nudgital society and the influence that social media has. The implicit underlying social structure of the nudgital society based on a complicated information gathering machinery should become subject to scrutiny and how, in particular, the nudgital class division is supported by a comprehensive social network data processing method. How social media advertising space can be used to specialize on targeted propaganda and misleading information to nudge the populace in an unfavorable way should be unraveled. The role of politicians’ use of various channels and instruments to manipulate the populace with targeted communication should be scrutinized.

In the recent US election the profit and value of detailed market information has been found to have gained unprecedented impetus. Future research should also draw a line between the results of the 2016 US presidential election, and the study of heuristics to elucidate that heuristics played a key role in Trump’s election as they made people less likely to vote logically. This would be key as it would help explain how people chose to vote, and why they do not always make the most logical choice when voting. This line of research could help to more accurately promote future elections’ candidates, how to better predict election outcomes and how to improve democracy.

In addition, nudging through means of visual merchandising, marketing and advertising should be captured in order to uphold ethical standards in social media. Nudging’s role in selling products, maximizing profits but also creating political trends should be uncovered. While there is knowledge on the visual merchandising in stores and window displays, little appears to be known how online appearances can nudge people into making certain choices. In particular, the familiarity heuristic, anchoring and the availability heuristic may play a role in implicitly guide people’s choices and discreetly persuade consumers and the populace. Not to mention advancements of online shopping integrity and e-commerce ethics, the prospective insights gained will aid uphold moral standards in economic market places and hopefully improve democratic outcomes of voting choices.
Contemporary studies could also address if the age of instant messaging has led to a loss of knowledge in information sharing. Future research should also investigate how search engines can be manipulated to make favorable sources more relevant and how artificial intelligence and social networks can become dangerous data manipulation means. The role of data processing companies may be studied in relation to the idea of data monopoly advantages – hence situations in which data processing companies may utilize data flows for their own purposes to support sponsored causes or their own ideals. Due to the specific time period of the digital age not extrapolations to past time periods is possible but the results appear useful in determining future behaviors.

The current research in this area lacks empirical evidence, demanding for further investigations on how nudges can directly impact individual’s choices and new media can become a governance manipulation tool. What social instruments are employed on social media and what prospects data processing has in the light of privacy infringement lawsuits should be uncovered. How social media is utilized to create more favorable social personas for political candidates should be explored. How internet online presences allow to gain as much attraction as possible for the presence of political candidates is another question of concern.

Another area of concern is how selective representations influence the voting population and what institutions and online providers are enabling repetitiveness and selectivity. How gathered individual information is used to parse data to manipulate social internet behavior and subsequent action is another topic to be investigated. Future research goals will include determining what this means for the future political landscape and how internet users should react to political appearances online. Information should be gathered how we choose what media to watch and if political views play a role in media selection and retention. Does distrust in the media further political polarization and partisanship, needs to be clarified. Future studies should also look into the relationship between individual’s political ideologies and how they use and interact on social media, especially with a focus on the concept of fake news and alternative facts. Where do these trends come from and who is more susceptible to these negative impacts of the digital society? Has social media become a tool to further polarize political camps, is needed to be asked. All these endeavors will help outlining the existence of social media’s influence in governance and data processing to aid political campaigning in order to derive inferences about democracy and political ethicality in the digital age.

How social media tools nudge people to not give everything at once but put it together in a novel way that it creates surplus, should be analyzed. In small bits and pieces individuals give up their privacy tranche be tranche. Small amounts of time are spent time for time. People,
especially young people, may have a miscalibration about the value of information released about them. Based on hyperbolic discounting myopia, they may underestimate the total future consequences of their share of privacy.

The time spent on social media should become closer subject to scrutiny and the impact on opportunity costs onto the labor market. For instance, countries that ban social media, such as China, or restrict internet, like slowing it down or censoring certain media, could become valuable sources of variance to compare to. Network theories for e-blasting information should become another area of interest to be studied in relation to hyper-hyperbolic discounting fallibilities. Emotional reactions and emotional externalities of communication could be another area of behavioral economics research in the privacy and information sharing predicament domain. The role of attention should be addressed as another moderator variable that is quite unstudied in the digital media era (Prat, in speech, November 2017). Thereby interesting new questions arise, such as how to measure attention – is it the time allocation or the emotional arousal information bestows individuals with (Wouter & Prat, forthcoming)?

The preliminary results may be generalized for other user-generated web contents such as blogs, wikis, discussion forums, posts, chats, tweets, podcastings, pins, digital images, videos, audio files, advertisements but also search engine data gathered or electronic devices (e.g., wearable technologies, mobile devices, Internet of Things). Certain features of the nudgital society may also hold for tracking data, including GPS, geolocation data, traffic and other transport sensor data and CCTV images or even satellite and aerial imagery. All preliminary results should be taken into consideration for future studies in different countries to examine other cultural influences and their effects on social class and heuristics.

Innovative means should be found to restore trust in media information and overcome obstacles such as the availability heuristic leading to disproportionate competitive advantages of media controlling parties. As remedies, consumer education should target at educating social media users about their rights and responsibilities on how to guard their own and other’s privacy. E-ethicality trainings could target at strengthening the moral impetus of big data and artificial ethicality in the digital age. Moral trade-offs between privacy infringements and security should also become subject to scrutiny.

Promoting governance through algorism offers novel contributions to the broader data science and policy discussion. Future studies should also be concerned with data governance and collection as well as data storage and curation in the access and distribution of online databases and data streams of instant communication. The human decision-making and behavior of data sharing in regards to ownership should become subject to scrutiny in
psychology. Ownership in the wake of voluntary personal information sharing and data provenance and expiration in the private and public sectors has to be legally justified (Donahue & Zeckhauser, 2011). In the future, institutional forms and regulatory tools for data governance should be legally clarified. Open, commercial, personal and proprietary sources of information that gets amalgamated for administrative purposes should be studied and their role in shaping the democracy. In the future we also need a clearer understanding of the human interaction with data and their social networks and clustering for communication results. The guarantee of safety of the information and the guarantee of the replacement or service, should a social media fail its function to uphold privacy law as intended, is another area of blatant future research demand. Novel qualitative and quantitative mixed methods featuring secondary data analysis, web mining and predictive models should be tested for holding for the outlined features of the new economy alongside advancing randomized controlled trials, sentiment analysis and smart contract technologies. Ethical considerations of machine learning and biologically inspired models should be considered in theory and practice. Mobile applications of user communities should be scrutinized.

As for consumer-worker conditions, unionization of the social media workers could help uphold legal rights and ethical imperatives of privacy, security and personal data protection. Data and algorithms should be studied by legal experts on licensing and ownership in the use of personal and proprietary data. Transparency, accountability and participation in data processing should also become freed from social discrimination. Fairness-awareness programs in data mining and machine learning coupled with privacy-enhancing technologies should be introduced in security studies of the public sector. Public rights of free speech online in the dialogue based on trust should be emphasized in future educational programs. Policy implications of the presented ideas range from security to human rights and law to civic empowerment. Citizen empowerment should feature community efforts to protect data and information sharing to be free of ethical downfalls. Social media use education should be ingrained in standard curricula and children should be raised with an honest awareness of their act of engagement on social media in the nudigital society of the digital century.

Future research may also delve into moderator variables of the utility derived from information sharing and privacy. For instance, extraversion and introversion could be moderating the overall pleasure derived from communication or silence. Future research may also address prescriptive recommendations how to educate individuals about the risks and dangers of information sharing in the digital age. Attention must also be paid to how to uphold accuracy in times of fake news and self-created social information. Certain societal segments
that are not represented strongly online should somehow be integrated into big data in order to democratize the information, which is considered as big data ‘norm,’ or standard by which the social media user is measured on. At the same time, psychologically guide studies could unravel a predictive approach and validate the outlined ideas’ validity by testing the proposed theoretical assumptions in laboratory and field study settings. In particular, the proposed nomenclature’s validity could be studied and the percentage of information sharing types captured in the population. The moderator variable age could be phased in as it appears to be conundrum why younger people, who have more to lose given a longer time ahead to live are in particular prone to use new social media and lavishly share their lives in e-blasts to public. Regarding direct implications, a tax may be used to offset problems of the costs and risks of social media privacy infringements in the big data era. Drawing from utility usually measured by the willingness to pay different amounts of money for different options, laboratory experiments may operationalize the value of privacy by measuring how much money people would be willing to pay for repurchasing their data or having a social media account that can only be viewed but no personal data can be resold or put in context to others. These attempts could also serve as a guideline for policy regulations and free market solutions. Social media could offer services of having accounts that are private in that sense that no surplus value can be reaped by reselling information or big data storage and computation can occur. This may serve as an indicator of revealed preferences of social media privacy. The privacy paradox may be scrutinized in behavioral economics laboratory and field experiments. Potential individual influencing factors such as gender, age, trust and personality differences may be tested for in order to retrieve information on how to educate the social media user and regulate the social media provider. Regarding regulation, splitting social media power cartels may be one solution to decrease the big data social media user disadvantage.

Taxation for information sharing may create another incentive to slow down unreflected information share. The tax revenues could be used to offset some of the societal costs of privacy infringement. In addition, fines for privacy infringement could help to uphold e-ethics in the digital age. From the economics perspective, interesting moderator variables for future studies is the distinction between active and passive communication. Further, model robustness checks could follow and learning effects depicted. Access to information what happens with data and

how big data is used appears crucial for learning people a well-calibration of their relation to their information. Communication costs and benefits are assumed to not be additive and separable, leaving an interesting field for future studies in this domain. The communication patterns could be classified in different types of communication in the future, e.g., certain node specificities detected, such as communication within a family, with friends and in hierarchical situations like at work. The absolute and relative influence of information sharers could become part of a network description approach as well. Impact factor measurements could be based on status, search engine rank and connections to capture global influence. Complexity of information would need to be controlled based on information processing times and time allocation preferences to information, hence attention. Communication costs should in the future to be separated in economic models in fixed and variable communication costs and a potential separation between fixed communication costs for social media providers and a variable communication costs for social media users be depicted (Prat, 2017).

Overall, the presented piece can also serve as a first step towards advocating for education about information sharing in order to curb harmful information sharing discounting fallibility. From legal and governance perspectives, the outlined ideas may stimulate the e-privacy infringement regulations discourse in the pursuit of the greater goals of democratization of information, equality of communication surplus and upheld humane dignity and e-ethics in the big data era.

Future research endeavors may also address inequality drawing on the future vision that central rational AI-hubs will outperform underdeveloped remote areas of the world even more in the digital age. The 2007-2008 financial crisis opened a period of deep and dramatic transformations. With the age of artificiality ringing in economic disruptions already visible in the polarized trend between globalization of data transfer and mobility against slowbalisation of conventional trade correlates, we may have to draw attention to advocacy for equality. We must establish a connection with one another based on common values and rediscover the sense of sharing, peace and social justice between not only the relation of human beings towards AI and AI towards human being. But we must also try integrate those parts of the world that have traditionally been serving as low-income outsource hubs, which may not be hurt from reshoring trends and competing with robots. These are the areas most fragile and first and hardest to be hit by the AI (r)evolution about to break. The first world and AI hubs must aid integrating those areas from being shunned from economic growth, which we must measure with novel tools and new, heterodox models. A universal taxation effort of revenues gained from AI, robots, algorithms, data transfer but also internet of things 5G could aid in raising funds in those
artificiality hubs to redistribute into the blind spots of AI. The construction of cohabitation and cooperation can bring man back to the center of society, freeing us from inequality. We should think of a new form of globalization on an equal footing where data flow and financial gain from the internet of things bestows human dignity and shared equality wherever they are. Together we must tear down the walls of unequal access to innovation and reaping benefits from new technologies and big data towards a balanced growth among the nations of the world in which human beings and machines are truly considered to uphold dignity and equality in the artificial age that has already come.
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Big data ethics

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**ABSTRACT:** Today enormous data storage capacities and computational power in the e-big data era have created unforeseen opportunities for big data hoarding corporations to reap hidden benefits from individual’s information sharing, which occurs bit by bit in small tranches over time. This paper presents underlying dignity and utility considerations when individual decision makers face the privacy versus information sharing predicament. Thereby the article unravels the legal foundations of dignity in privacy but also the behavioral economics of utility in communication and information sharing. From legal and governance perspectives, the outlined ideas may stimulate the e-privacy discourse in the age of digitalization but also serving the greater goals of democratisation of information and upheld humane dignity in the realm of e-ethics in the big data era.

**Key words:** Behavioral Economics, Behavioral Political Economy, Democratisation of information, Dignity, Education, Exchange value, Governance, Preferences, Social media, Utility, Values
1. Introduction

Although communication and non-communication are day-to-day decisions of individuals; to this day, there is no stringently tested utility theory of information sharing and privacy. We lack a coherent decision science framework about when people choose to share information and when they rather want to stay silent for the sake of privacy. From the economic perspective, information sharing may impose temporal irreversible lock-ins or tipping points. The point of information sharing may be a reference point, in which one bit of more communication gives less utility than one bit of less information shared, hence one bit of more privacy, grants more utility in the sense of Kahneman & Tversky’s (1979) behavioral decision science finding ‘losses loom larger than gains.’ There may also be a marginal decreasing utility derived from one bit more information shared but an exponential marginal utility gain from one more unit of information received given the fact that information can be put into context and an exponentially increasing marginal utility of information. Education, for instance, is the only good with an exponential marginal utility increase, as the more information one holds, the more complex connections one can make and use.

In the past, communication was depicted to decentralize organizations (Crémer, Garicano & Prat, 2007). Media was initially promoted to offer means of information transfer, political participation and protection against political abuse (Delli Carpini & Keeter, 1989; Neuman, Just & Crigler, 1992; Norris & Sanders, 2003; Prat & Strömberg, 2005; Snyder & Strömberg, 2010). Evidence suggests that media coverage increases voter information, which increases the responsiveness of votes to policy, which increases the effort and selection of politicians, thus producing better policies (Prat & Strömberg, 2013). Media thus traditionally was portrayed as helping to keep politicians accountable (Prat & Strömberg, 2013). Media coverage was found to improve selection and incentives of politicians alongside voting responsiveness (Iyengar & Kinder, 1987; Snyder & Strömberg, 2010).

Critical studies in this regard show that there are negative downsides of transparency (Prat, 2005). Mass media can also erode social capital, as they potentially isolate people from real-world experiences (Olken, 2009; Putnam, 2000). A positive relation between federal funds per capita allocation to areas where the media covered political parties in power was found (Snyder & Strömberg, 2010). Research has been done on the effect of conventional media on politics including a nomenclature of biases that impose problems – especially against minority opinions (Prat & Strömberg, 2013). Ideological biases are found in conventional media and media effects captured on vote choice (Prat & Strömberg, 2013). While the negative facets of information on elections and the role of social media on voting outcomes has been widely discussed recently; yet to this day no stringent theoretical or empirical framework for the utility of privacy and information sharing on social media exits.

In the digital age, to study the trade-off between information sharing and privacy has leveraged into unprecedented importance. Social media revolutionized human communication around the globe. As never before in the history of humankind, information about individuals can be stored and put in
context over time and logically placed within society thanks to unprecedented data conservation and computational powers. The big data era, however, also opened gates to unprecedentedly reap benefits from information sharing and big data generation (Puaschunder, 2017). The so-called nudgital society was recently introduced, shedding light onto the undescribed hidden social class division between social media users and social media providers, who can benefit from the information shared by social media users. Social media users share private information in their wish to interact with friends and communicate to public. The social media big data holder can then reap surplus value from the information shared by selling it to marketers, who can draw inferences about consumer choices. The big data can also be used for governance control purposes, for instance border protection and tax compliance control.

Drawing from the economic foundations of utility theory, this paper seeks to introduce the first application of utility theory to a preference-values predicament between communication and privacy in the new media era. Behavioral economics insights are advanced in shedding novel light on the conflict between the humane wish to communicate now versus combined information held by unknown big data compilers in the future. An exponential loss of privacy and hyper-hyperbolic risks in the future for the information sharer are introduced as behavioral economic decision-making fallibilities. For the overconfident information sharer, it remains largely unforeseeable what the sum of the individual information sharing tranches can lead to over time and what information its Gestalt holds for those who have big data insights over time, which can also be analyzed in relation to the general population. Governance gains a critical stance on new media use for guiding on public concerns regarding privacy and information sharing in the digital age (Puaschunder, 2017). While there is some literature on the history of media on politics (Prat & Strömberg, 2013), the wide societal implications of fake news and discounting misinformation has widely been overlooked in contemporary behavioral economics research and the externalities literature. Social sciences literature on privacy and information sharing has to be reconsidered in the age of social media.

The article is structured as follows: An introduction of the theory of utility and communication and information sharing is followed by an outline of the impetus of the digital big data age on privacy. The first utility theory of information sharing and privacy will be theoretically introduced. Hyperbolic decision making fallibility will become the basis of argumentations around hyper-hyperbolic discounting – the novel argument that information sharing in tranches may lead to an underestimation of the privacy infringements when these bits of information can be put together over time and are compared to big data in order to infer about the individual in relation to the general population.

The subjective additive utility of information-shared tranche by tranche may underestimate the big data holder’s advantage to reap benefits from information shared. The discussion introduces problems of the contemporary nudgital society (Puaschunder, 2017), in which big data compilers can
reap a surplus value from selling compiled information (The New York Times, November 14, 2017)‡‡ or manipulate vulnerable population segments based on their previously shared information (The Economist, November 4, 2017).§§ Implications lead to open questions about ethics in the information age and recommendations for a reclaiming of the common good of shared knowledge in education about information sharing in the digital age as well as the democratization of information. Challenging contemporary behavioral insights theory aims at fostering a more informed, self-determined and protected digital society in the wish to uphold e-ethics in the 21st century big data social media era.

2. Utility theory

Economic theory is built upon the idea of utility, which captures people’s preferences or values (Fishburn, 1968). Human are believed to strive to maximize utility on a constant basis by weighting their preferences and values on the pleasure they would receive from different options. In neoclassic economics, utility theory primarily focuses on prescriptive utility maximization giving recommendations how individuals should behave to maximize their utility. Prescriptive utility maximization theory serves as normative guide in helping the decision maker codify preferences. If preferences would violate rational preference choices, the theory suggests strategies so the informed decision maker can revise their rational reference choices and judgments to eliminate preference inconsistency. Using utility theory, preferences are constantly transformed into corresponding numerical utility data that is portrayed to maximize the individual’s pursuit of happiness. Utility theory provides a powerful set to determine how to compare actual alternatives. It enables the decision maker’s optimal preferences to be transformed into a numerical utility structure guided by an optimization algorithm.

In doing so, standard microeconomic utility theory has been of aid to explain how to maximize individual outcomes in very many different domains ranging from marketing research (Greenberg & Collins, 1966; Marquardt, Makens & Lanzelere, 1965; Stafford, 1966), food industry quality control of products and corporate strategies (Read, 1964; Stillson, 1954) and production (Aumann & Kruskal, 1958, 1959; Suzuki, 1957).

3. Dignity

Dignity is the right to be valued and respected for one’s own sake and to be treated ethically. Everyone has a right to respect for their dignity.”*** As an inherent, inalienable right, dignity is a core concept in fields such as morality, ethics, law and politics. Often connected to identity and respect for

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§§ https://www.economist.com/news/leaders/21730871-facebook-google-and-twitter-were-supposed-save-politics-good-information-drove-out
*** United Nations 1998 UNESCO Declaration on the Human Genome and Human Rights. At Article 2
integrity and other fundamental freedoms and rights, dignity is often used to uphold the ethical considerations around oppressed and vulnerable groups, who do not have insights about the consequences of their actions. Individuals derive self-worth from dignity. While dignity itself seems to be a vague concept, it is often used as a boundary condition of what is right, just and fair to argue for the improvement of conditions for discriminated, vulnerable and targeted. Violations of dignity are felt as humiliation, instrumentalization or objectification, degradation and dehumanization. Privacy infringements have been argued to hold concerns regarding dignity. In the age of digital media and big data, when individual decision makers may have hyper-hyperbolic discounting fallibility regarding their share of data, dignity infringements may happen mainly unnoticed. Individuals may be endowed with reason and conscience but their decision making capabilities may not be able to discount the worth of their information in the future and in relation to other individuals’ data forming big data insights. The freedom of expression may hold a shadow of the future. Dignity based protection of medical patients and in biology settings may serve as dignity based privacy beacons in the age of big data. Dignity has become the legal-ethical foundation of new reproductive and genetic technologies, medicine and genetic ethics research on humans, life and health sciences, ethics around cloning, medical integrity, bioethics, but also against war cruelty, criminal punishment, imprisonment, terrorism, weapons, abortion, sex work and defamation. The core idea of dignity is prevalent in cultures of the world and has been extended onto animals and the environment.

3. Information sharing and privacy

The wish for communication is inherent in human beings as a distinct feature of humanity. Leaving a written legacy that can inform many generations to come is a humane-unique advancement of society. At the same time, however, privacy is a core human value. People choose what information to share with whom and like to protect some parts of their selves in secrecy. Protecting people’s privacy is a codified virtue around the world to uphold the individual’s dignity. Yet to this day, no utility theory exists to describe the conflict arising from the individual preference to communicate and the value of privacy.

4 The humane preference for communication

The act of conveying intended meanings from one entity or group to another through the use of mutually understood signs and semiotic rules is the act of communication. Communication is a key feature of humans, animals and even plants (Witzany, 2012). Steps inherent to all human communication are the formation of communicative motivation and reason, message composition as further internal or technical elaboration on what exactly to express, message encoding, transmission of the encoded message as a sequence of signals using a specific channel or medium, noise sources influencing the quality of signals propagating from the sender to one or more receivers, reception of signals and
reassembling of the encoded message from a sequence of received signals, decoding of the reassembled encoded message and interpretation or sense making of the presumed original message (Shannon, 1948). Information sharing implying giving up privacy is at the core of communication. Communication can be verbal and non-verbal. Comprising very many different domains ranging from business, politics, interpersonal, social to mass media; communication is a humane-imbued wish and center core of every functioning society.

In society, language is used to exchange ideas and embody theories of reality. Language is the driver of social progress (Orwell, 1949). Linguists find discourse and information sharing inseparable from socio-economic societal advancement (Fowler, Hodge, Kress & Trew, 1979). Language and communication modes are implicit determinations of social strata (Orwell, 1949). Different institutions and media sources have different varieties of language and information sharing styles. Access to information is related to social status and market power. Social visibility is a powerful and cheap incentive to make people contribute more to public goods and charities and be less likely to lie, cheat, pollute or be insensitive and antisocial (Ali & Benabou, 2016). Information receipt is an implicit determinant to classify and rank people to assert institutional or personal status in society (Fowler et al., 1979). Mass communication echoes in economic cycles in the creation of booms and busts (Puaschunder, work in progress). Media is also a hallmark of propaganda and political control (Besley & Prat, 2006; Prat & Strömberg, 2013). At the same time, privacy is a human virtue around the world.

5. Privacy as a human virtue

Privacy is the ability of an individual or group to seclude themselves, or information about themselves, and thereby share information about themselves selectively. The right to privacy grants the ability to choose which information about parts of the self can be accessed by others and to control the extent, manner and timing of the use of those parts we choose to disclose. Privacy comprises of the right to be let alone, the option to limit the access others have to one’s personal information and secrecy as the option to conceal any information about oneself (Solove, 2008).

The degree of privacy varies in autonomy levels throughout individualistic and collectivism cultures. While the boundaries and contents protected and what is considered as private differ widely among cultures and individuals, the common sense in the world is that some parts of the self should be protected as private.

Privacy has a valued feature of being something inherently special or sensitive to a person, which can create value and specialty if shared with only a selected person or group. The domain of privacy partially overlaps with security, confidentiality and secrecy, which are codified and legally protected throughout the world, mainly in privacy laws but also in natural laws of virtues of integrity.
and dignity. Privacy is seen as a collective core human value and fundamental human right, which is upheld in constitutions around the world††† (Johnson, 2009; Warren & Brandeis, 1890).

In personal relations, privacy can be voluntarily sacrificed, normally in exchange for reciprocity and perceived benefits. Sharing private information can breed trust and bestow meaningfulness to social relations. Giving up privacy holds risks of uncertainty and losses, which are undescribed in economics and in particular the behavioral economics literature on intertemporal decision-making (Gaudeul & Giannetti, 2017). People tend to be more willing to voluntarily sacrifice privacy if the data gatherer is seen to be transparent as to what information is gathered and how the information will be used (Oulasvirta, Suomalainen, Hamari, Lampinen & Karvonen, 2014). Privacy as a prerequisite for the development of a sense of self-identity is a core of humanness (Altman, 1975). Privacy is often protected to avoid discrimination, manipulation, exploitation, embarrassment and risks of reputational losses, for instance, in the domains of body parts, home and property, general information of private financial situations, medical records, political affiliation, religious denomination, thoughts, feelings and identity.

Technological shocks have a history of challenging privacy standards (Warren & Brandeis, 1890). The age of instant messaging and big data, however, has leveraged the idea of privacy to another dimension. The concept of information privacy has become more significant as more systems controlling big data appear in the digital age. With advances in big data, face recognition, automated licence-plate readers and other tracking technologies, the upholding privacy and anonymity has become increasingly expensive and the cost is more opaque than ever before (Ali & Benabou, 2016).

6. Privacy in the digital big data era

The amount of big data stored each second has reached an all time high in the digital era. Internet privacy is the ability to determine what information one reveals or withholds about oneself over the internet, who has access to personal information and for what purpose one’s information may be used. Privacy laws in many countries have started to adapt to changes in technology in order to cope with unprecedented constant information surveillance possibilities, big data storage opportunities and computational power peaks. For instance, Microsoft reports that 75 percent of U.S. recruiters and human-resource professionals use online data about candidates, often using information provided by search engines, social-network sites, photo and video sharing tools, personal web appearances like websites and blogs, as well as Twitter.

Social media tools have become large-scale factories with unpaid labor (Puaschunder, 2017). For instance, Facebook accounts for the largest social-network site with nearly 1,490 million members.

††† E.g., Asian-Pacific Economic Cooperation, Australia, Brazil, Canada, China, European Union, Italy, Japan, Korea, Organisation for Economic Co-operation and Development, South Africa, United Kingdom, United Nations, United States, Universal Declaration of Human Rights – to name a few.
who upload over 4.75 billion pieces of content about their lives and that of others daily. The accuracy of this information also appears questionable, with about 83.09 million accounts assumed to be fake. Aside from directly observable information, social media sites can also easily track browsing logs and patterns, search queries or secondary information giving inferences about sexual orientation, political and religious views, race, substance use, intelligence and overall personality, mental status, individual views and preferences (Kosinski, Bachrach, Stillwell, Kohli & Graepel, in press; Kosinski, Stillwell & Graepel, 2013).

As for the unprecedented possibilities to collect data, store big data and aggregate information that can be compared to big data Gestalt over time and society, privacy has leveraged into one of the most fragile areas of concern in the electronic age, demanding for legal protection, regulatory control and e-ethics (Flaherty, 1989). Today, the existing global privacy rights framework in the digital age has been criticized to be incoherent, inefficient and in need for revision. Global privacy protection shields are demanded to be established. Yet to this day there is no economic framework on information sharing and privacy control. While – for instance – Posner (1981) criticizes privacy for concealing information, which reduces market efficiency; Lessig (2006) advocates for regulated online privacy. As of now we lack a behavioral decision making frame to explain the privacy paradox of the individual predicament between the humane-imbued preference to communicate and information share versus value of privacy. We have no behavioral economics description of inconsistencies and moderator variables in the decision between online information sharing behavior and retroactive preference reversal preferences in the eye of privacy concerns in the digital big data era.

7 A utility theory of information sharing and privacy

Building on classical utility theory, individuals are constantly evaluating competing choice options. Individuals weight alternative options based on their expected utility derived. Indifference curves would then connect points on a graph representing different quantities of two goods, between which an individual is indifferent.

In the case of the privacy paradox of information sharing preferences and privacy values, a person would weights whether or not to share information $s$ or choose the information to remain private $p$. The respective indifference curves would outline how much of information sharing $s$ and privacy $p$ can be enabled to end with the same utility given the budget of overall information held by the decision maker.

Graph 1 represents the respective indifference curves for information sharing $s$ and privacy $p$. That is, the individual has no preference for one combination or bundle of information sharing or privacy over a different combination of the same curve. All points on the curve hold the same utility for the individual. The indifference curve is therefore the locus of various points of different combinations of privacy and information sharing providing equal utility to her or him. Indifference curves are thereby
seen to represent potentially observable behavioral patterns for individuals over information bundles. The indifference curve for information sharing $s$ and privacy $p$ is subject to communication and information constraints, hence all information budgets and communication opportunities. There is only a finite amount of information and there may be environmental conditions determining if people can exchange and share information. As exhibited in graph 1, the indifference curve for information sharing $s$ and privacy $p$ is a straight line given the assumption that information sharing or privacy are substitutes.

Graph 1: Indifference curve (blue line) for information sharing $s$ and privacy $p$ given the total information and communication constraint

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\frac{b_c - c_c}{\sigma}
\] (Equation 4.1)

While in classical economics, an individual was believed to always being able to rank any consumption bundles by order of preference (Jevons, 1871); the indifference curve for information sharing $s$ and privacy $p$ subject to communication and information constraints may feature a hyper-hyperbolic element or temporal dimension. The information share moment may thereby be a reference point. At the moment of the information sharing decision, it may not be foreseeable what the future implication of the information sharing is.

In general, the costs and benefits of communication are assumed as linear subtraction of positive benefits of communication $b_c$ minus the negative consequences of communication $c_c$. The nature of the problem is intertemporal as information sharers cannot foresee the future implications of their information sharing divided by variance $\sigma$ (Prat, 2017).

However, the digital social media era has heralded a hyper-hyperbolic discounting fallibility. Individuals have lost oversight of the consequences of their individual information sharing given big data hoarding capabilities, which also allow drawing inferences about the individual in relation to others.

In the digital big data era, information share online may hold unforeseen risks of privacy merchants or social media capitalists that commercialize information reaping hidden benefits from the

‡‡‡ http://www.econlib.org/library/YPDBooks/jevons/jvnPE.html
The subjective additive utility of information shared tranche by tranche may underestimate the big data holder’s advantage to reap benefits from information shared given unprecedented data storage and big data computation power advantages of the big data era. Unprecedented computational power and storage opportunities have created the possibility to hoard information over time and put it in context with the rest of the population in order to draw inferences about the information sharer (The New York Times, November 14, 2017). The digital age and era of instant information sharing have therefore heralded problems of individuals who give in their basic humane need for information communication to become vulnerable over time. The big data information holder may thereby benefit from the history of information and the relation of the individual’s information in comparison to the general population to an unknown degree given missing e-literacy and transparency. Comparison to the general public may lead to an implicit underrepresentation and hence discrimination of vulnerable groups. For instance, certain groups that may not be represented online will therefore likely face an under-advocacy of their rights and needs.

While regular hyperbolic discounting captures a game theoretical predicament of the self now versus the self later, the information offering more of a Gestalt in the eyes of the big data holder, leverages hyperbolic discounting to a game theory against uncertainty on the end of the big data holder. The hyper-hyperbolic discounting fallibility therefore may describe that at the moment of information sharing, the individual has hardly any grasp what is implied in the giving up of privacy. The individual only focuses on the current moment trade-off between information sharing and privacy upholding, but hardly has any insights what the compiled information over time holds for big data moguls. As for holding computational and storage advantages, the social media big data moguls can form a Gestalt which is more than the sheer sum of the individual information shared, also in comparison to the general populace’s data. The shared information can also be resold to companies (Etzioni, 2012; The New York Times, November 14, 2017). In relation to other people’s information, the big data moguls can make predictions about their choices and behaviors. Information can also be used for governance purposes, for instance tax compliance and border control mechanisms (Puaschunder, 2017). Some governments

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666 https://www.economist.com/news/leaders/21730871-facebook-google-and-twitter-were-supposed-save-politics-good-information-drove-out


have recently used big data to check the accuracy of tax reports but also to detect people’s political views when crossing borders (Puaschunder, 2017). Lastly, the use of big data inferences also implies hidden persuasion means – nudging can be turned against innocent information sharers who have no long-term and computational advantage to foresee the impact of the information share (The Economist, November 4, 2017; Puaschunder, 2017).

While behavioral economics hyperbolic discounting theory introduces the idea of time-inconsistency of preferences between an individual now and the same individual in the future; hyper-hyperbolic discounting underlines that in the case of information sharing preferences this fallibility is exacerbated since individuals lose control over their data and big data moguls can reap surplus value from the social media consumer-workers’ information sharing and derive information complied over time and in relation to the general norm to draw inferences about the innocent information sharer. With the modern digital era, all these features open an information sharer versus information reaper divide in the big data age (Puaschunder, 2017).

From the social media big data capitalist view, the information gain of one more person sharing information is exponentially rising. Hence, the marginal utility derived from one more person providing information is increasing exponentially and disproportionally to the marginally declining costs arising from one more person being added to the already existing social media platform. Communication costs and benefits are assumed to not be additive and separable.

8 Conclusion and future prospects

The article presented a first theoretical introduction of a utility theory of information sharing and privacy. Potential limitations are that some communication may not be integrated in the framework, such as nonverbal communication or emotional responses. In general information exchange is very heterogeneous and vast international differences are assumed to exist. In addition, in what time online communication and under what circumstances decisions regarding communication and privacy are made, remains a completely undiscussed topic.

As a next research step, a stringent hypotheses testing of the presented problem is recommended. For instance, future research projects featuring a multi-methodological approach will help gain invaluable information about the actual performance and behavior regarding information sharing and privacy upholding. Interaction of individuals on social media should be scrutinized in order to derive real-world relevant economic insights for legal and policy making purposes alongside advancing an upcoming scientific field.

Following empirical investigations should employ a critical survey of the intersection of analytic and behavioral perspectives to decision making in information sharing. Literature discussion

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featuring a critical analysis how to improve e-literacy should be coupled with e-education and enhancement of e-ethicality. Research should be directed towards a critical analysis of the application of behavioral economics on hyper-hyperbolic discounting in the digital age. In the behavioral economics domain, both approaches, studying the negative implications of information sharing and decision making to uphold privacy but also finding ways how to train new media users wiser decisions should be explored. Interdisciplinary viewpoints and multi-method research approaches should be covered in the heterodox economics readings but also in a variety of independent individual research projects. Research support and guidance should be targeted at nurturing interdisciplinary research interests on privacy and information sharing in the fields of behavioral economics and public affairs.

More concretely, future studies should define the value that data has to individuals and data sovereignty in the international context. When people share information, they should be informed to consider what the benefit and value from information sharing is for them and what the benefit for social media industrialists-capitalists is. The sovereignty of data and the human dignity of privacy should become debated as civic virtual virtue in the 21st century. Individuals should be informed that sharing data is a personal security risk, if considered to be asked for social media information upon entry of a country.

Future studies should describe what companies and institutions constitute the complex system that helps establishing the nudgital society and the influence that social media has. The implicit underlying social structure of the nudgital society based on a complicated information gathering machinery should become subject to scrutiny and how, in particular, the nudgital class division is supported by a comprehensive social network data processing method. How social media advertising space can be used to specialize on targeted propaganda and misleading information to nudge the populace in an unfavorable way should be unraveled. The role of politicians’ use of various channels and instruments to manipulate the populace with targeted communication should be scrutinized.

In the recent US election the profit and value of detailed market information has been found to have gained unprecedented impetus. Future research should also draw a line between the results of the 2016 US presidential election, and the study of heuristics to elucidate that heuristics played a key role in Trump’s election as they made people less likely to vote logically. This would be key as it would help explain how people chose to vote, and why they do not always make the most logical choice when voting. This line of research could help to more accurately promote future elections’ candidates, how to better predict election outcomes and how to improve democracy.

In addition, nudging through means of visual merchandising, marketing and advertising should be captured in order to uphold ethical standards in social media. Nudging’s role in selling products, maximizing profits but also creating political trends should be uncovered. While there is knowledge on the visual merchandising in stores and window displays, little appears to be known how online appearances can nudge people into making certain choices. In particular, the familiarity heuristic, anchoring and the availability heuristic may play a role in implicitly guide people’s choices and
discreetly persuade consumers and the populace. Not to mention advancements of online shopping integrity and e-commerce ethics, the prospective insights gained will aid uphold moral standards in economic market places and hopefully improve democratic outcomes of voting choices.

Contemporary studies could also address if the age of instant messaging has led to a loss of knowledge in information sharing. Future research should also investigate how search engines can be manipulated to make favorable sources more relevant and how artificial intelligence and social networks can become dangerous data manipulation means. The role of data processing companies may be studied in relation to the idea of data monopoly advantages – hence situations in which data processing companies may utilize data flows for their own purposes to support sponsored causes or their own ideals. Due to the specific time period of the digital age not extrapolations to past time periods is possible but the results appear useful in determining future behaviors.

The current research in this area lacks empirical evidence, demanding for further investigations on how nudges can directly impact individual’s choices and new media can become a governance manipulation tool. What social instruments are employed on social media and what prospects data processing has in the light of privacy infringement lawsuits should be uncovered. How social media is utilized to create more favorable social personas for political candidates should be explored. How internet online presences allow to gain as much attraction as possible for the presence of political candidates is another question of concern. Another area of concern is how selective representations influence the voting population and what institutions and online providers are enabling repetitiveness and selectivity. How gathered individual information is used to parse data to manipulate social internet behavior and subsequent action is another topic to be investigated. Future research goals will include determining what this means for the future political landscape and how internet users should react to political appearances online. Information should be gathered how we choose what media to watch and if political views play a role in media selection and retention. Does distrust in the media further political polarization and partisanship, needs to be clarified. Future studies should also look into the relationship between individual’s political ideologies and how they use and interact on social media, especially with a focus on the concept of fake news and alternative facts. Where do these trends come from and who is more susceptible to these negative impacts of the digital society? Has social media become a tool to further polarize political camps, is needed to be asked. All these endeavors will help outlining the existence of social media’s influence in governance and data processing to aid political campaigning in order to derive inferences about democracy and political ethicality in the digital age.

How social media tools nudge people to not give everything at once but put it together in a novel way that it creates surplus, should be analyzed. In small bits and pieces individuals give up their privacy tranche be tranche. Small amounts of time are spent time for time. People, especially young people, may have a miscalibration about the value of information released about them. Based on hyperbolic discounting myopia, they may underestimate the total future consequences of their share of privacy.
The time spent on social media should become closer subject to scrutiny and the impact on opportunity costs onto the labor market. For instance, countries that ban social media, such as China, or restrict internet, like slowing it down or censoring certain media, could become valuable sources of variance to compare to. Network theories for e-blasting information should become another area of interest to be studied in relation to hyper-hyperbolic discounting fallibilities. Emotional reactions and emotional externalities of communication could be another area of behavioral economics research in the privacy and information sharing predicament domain. The role of attention should be addressed as another moderator variable that is quite unstudied in the digital media era (Prat, in speech, November 2017). Thereby interesting new questions arise, such as how to measure attention – is it the time allocation or the emotional arousal information bestows individuals with (Wouter & Prat, forthcoming)?

The preliminary results may be generalized for other user-generated web contents such as blogs, wikis, discussion forums, posts, chats, tweets, podcastings, pins, digital images, videos, audio files, advertisements but also search engine data gathered or electronic devices (e.g., wearable technologies, mobile devices, Internet of Things). Certain features of the nudigital society may also hold for tracking data, including GPS, geolocation data, traffic and other transport sensor data and CCTV images or even satellite and aerial imagery. All preliminary results should be taken into consideration for future studies in different countries to examine other cultural influences and their effects on social class and heuristics.

Innovative means should be found to restore trust in media information and overcome obstacles such as the availability heuristic leading to disproportionate competitive advantages of media controlling parties. As remedies, consumer education should target at educating social media users about their rights and responsibilities on how to guard their own and other’s privacy. E-ethicality trainings could target at strengthening the moral impetus of big data and artificial ethicality in the digital age. Moral trade-offs between privacy infringements and security should also become subject to scrutiny.

Promoting governance through algorism offers novel contributions to the broader data science and policy discussion. Future studies should also be concerned with data governance and collection as well as data storage and curation in the access and distribution of online databases and data streams of instant communication. The human decision-making and behavior of data sharing in regards to ownership should become subject to scrutiny in psychology. Ownership in the wake of voluntary personal information sharing and data provenance and expiration in the private and public sectors has to be legally justified (Donahue & Zeckhauser, 2011). In the future, institutional forms and regulatory tools for data governance should be legally clarified. Open, commercial, personal and proprietary sources of information that gets amalgamated for administrative purposes should be studied and their role in shaping the democracy. In the future we also need a clearer understanding of the human interaction with data and their social networks and clustering for communication results. The guarantee of safety of the information and the guarantee of the replacement or service, should a social media fail its function to uphold privacy law as intended, is another area of blatant future research demand. Novel
qualitative and quantitative mixed methods featuring secondary data analysis, web mining and predictive models should be tested for holding for the outlined features of the new economy alongside advancing randomized controlled trials, sentiment analysis and smart contract technologies. Ethical considerations of machine learning and biologically inspired models should be considered in theory and practice. Mobile applications of user communities should be scrutinized.

As for consumer-worker conditions, unionization of the social media workers could help uphold legal rights and ethical imperatives of privacy, security and personal data protection. Data and algorithms should be studied by legal experts on licensing and ownership in the use of personal and proprietary data. Transparency, accountability and participation in data processing should also become freed from social discrimination. Fairness-awareness programs in data mining and machine learning coupled with privacy-enhancing technologies should be introduced in security studies of the public sector. Public rights of free speech online in the dialogue based on trust should be emphasized in future educational programs. Policy implications of the presented ideas range from security to human rights and law to civic empowerment. Citizen empowerment should feature community efforts to protect data and information sharing to be free of ethical downfalls. Social media use education should be ingrained in standard curricula and children should be raised with an honest awareness of their act of engagement on social media in the nudigital society of the digital century.

Future research may also delve into moderator variables of the utility derived from information sharing and privacy. For instance, extraversion and introversion could be moderating the overall pleasure derived from communication or silence. Future research may also address prescriptive recommendations how to educate individuals about the risks and dangers of information sharing in the digital age. Attention must also be paid to how to uphold accuracy in times of fake news and self-created social information. Certain societal segments that are not represented strongly online should somehow be integrated into big data in order to democratize the information, which is considered as big data ‘norm,’ or standard by which the social media user is measured on. At the same time, psychologically guide studies could unravel a predictive approach and validate the outlined ideas’ validity by testing the proposed theoretical assumptions in laboratory and field study settings. In particular, the proposed nomenclature’s validity could be studied and the percentage of information sharing types captured in the population. The moderator variable age could be phased in as it appears to be conundrum why younger people, who have more to lose given a longer time ahead to live are in particular prone to use new social media and lavishly share their lives in e-blasts to public. Regarding direct implications, a tax may be used to offset problems of the costs and risks of social media privacy infringements in the big data era. ***** Drawing from utility usually measured by the willingness to pay

different amounts of money for different options, laboratory experiments may operationalize the value of privacy by measuring how much money people would be willing to pay for repurchasing their data or having a social media account that can only be viewed but no personal data can be resold or put in context to others. These attempts could also serve as a guideline for policy regulations and free market solutions. Social media could offer services of having accounts that are private in that sense that no surplus value can be reaped by reselling information or big data storage and computation can occur. This may serve as an indicator of revealed preferences of social media privacy. The privacy paradox may be scrutinized in behavioral economics laboratory and field experiments. Potential individual influencing factors such as gender, age, trust and personality differences may be tested for in order to retrieve information on how to educate the social media user and regulate the social media provider. Regarding regulation, splitting social media power cartels may be one solution to decrease the big data social media user disadvantage. Taxation for information sharing may create another incentive to slow down unreflected information share. The tax revenues could be used to offset some of the societal costs of privacy infringement. In addition, fines for privacy infringement could help to uphold e-ethics in the digital age. From the economics perspective, interesting moderator variables for future studies is the distinction between active and passive communication. Further, model robustness checks could follow and learning effects depicted. Access to information what happens with data and how big data is used appears crucial for learning people a well-calibration of their relation to their information. Communication costs and benefits are assumed to not be additive and separable, leaving an interesting field for future studies in this domain. The communication patterns could be classified in different types of communication in the future, e.g., certain node specificities detected, such as communication within a family, with friends and in hierarchical situations like at work. The absolute and relative influence of information sharers could become part of a network description approach as well. Impact factor measurements could be based on status, search engine rank and connections to capture global influence. Complexity of information would need to be controlled based on information processing times and time allocation preferences to information, hence attention. Communication costs should in the future to be separated in economic models in fixed and variable communication costs and a potential separation between fixed communication costs for social media providers and a variable communication costs for social media users be depicted (Prat, 2017).

Overall, the presented piece can also serve as a first step towards advocating for education about information sharing in order to curb harmful information sharing discounting fallibility. From legal and governance perspectives, the outlined ideas may stimulate the e-privacy infringement regulations discourse in the pursuit of the greater goals of democratization of information, equality of communication surplus and upheld humane dignity and e-ethics in the big data era.
References


